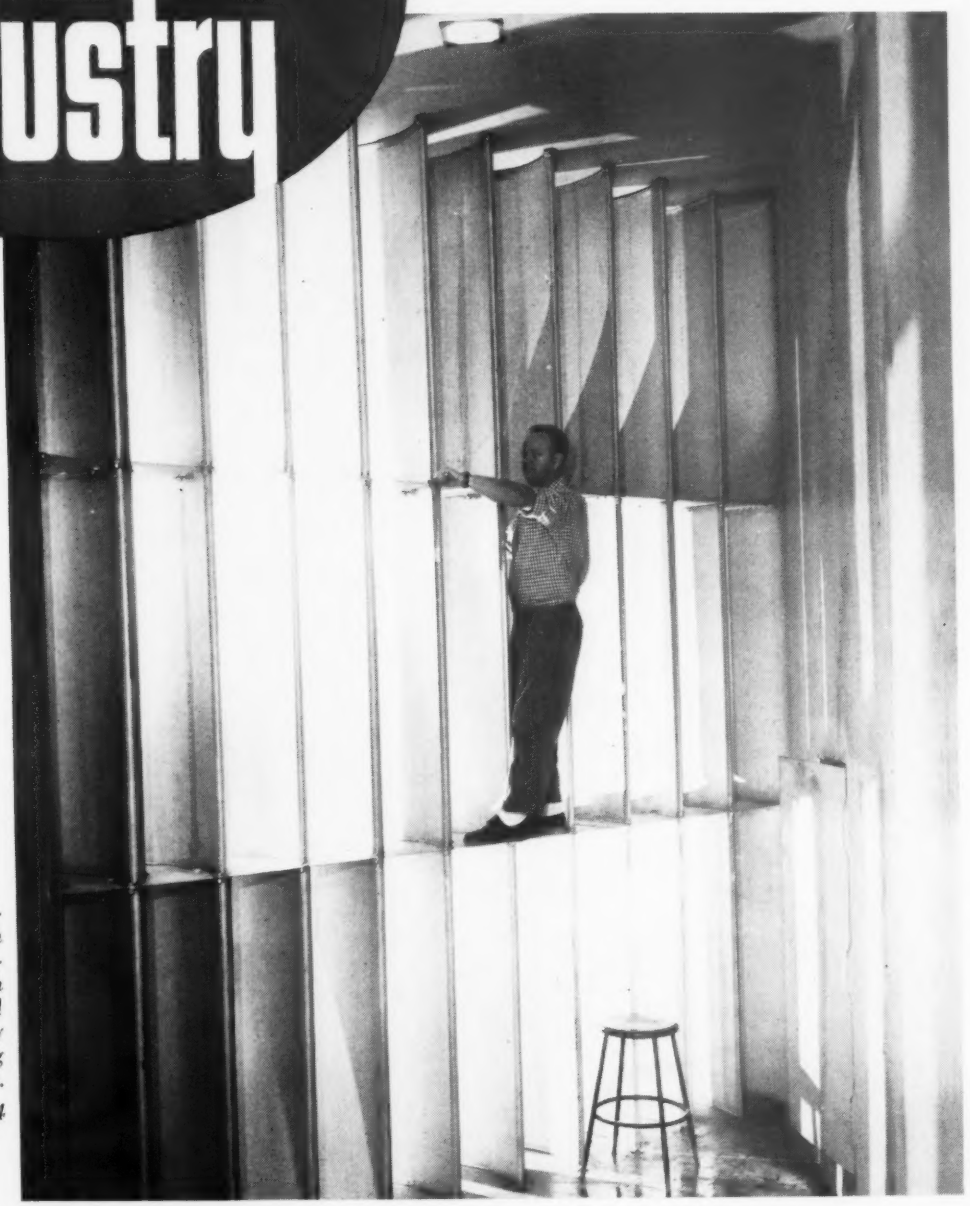
Western Industry

April 1955



MAN-MADE blizzards roar through this new wind tunnel to simulate high altitude weather. A mechanic carefully checks all turning vanes after a test.

. . . see page 24

Work smarter, not harder

Corrosion causes and cures

Propane power proves cheaper

Table of contents . . . page 4

Bright ideas..

The automotive industry is noted for its Bright Ideas . . . it uses felt in at least 82 different ways, because the right type of felt does those jobs best.

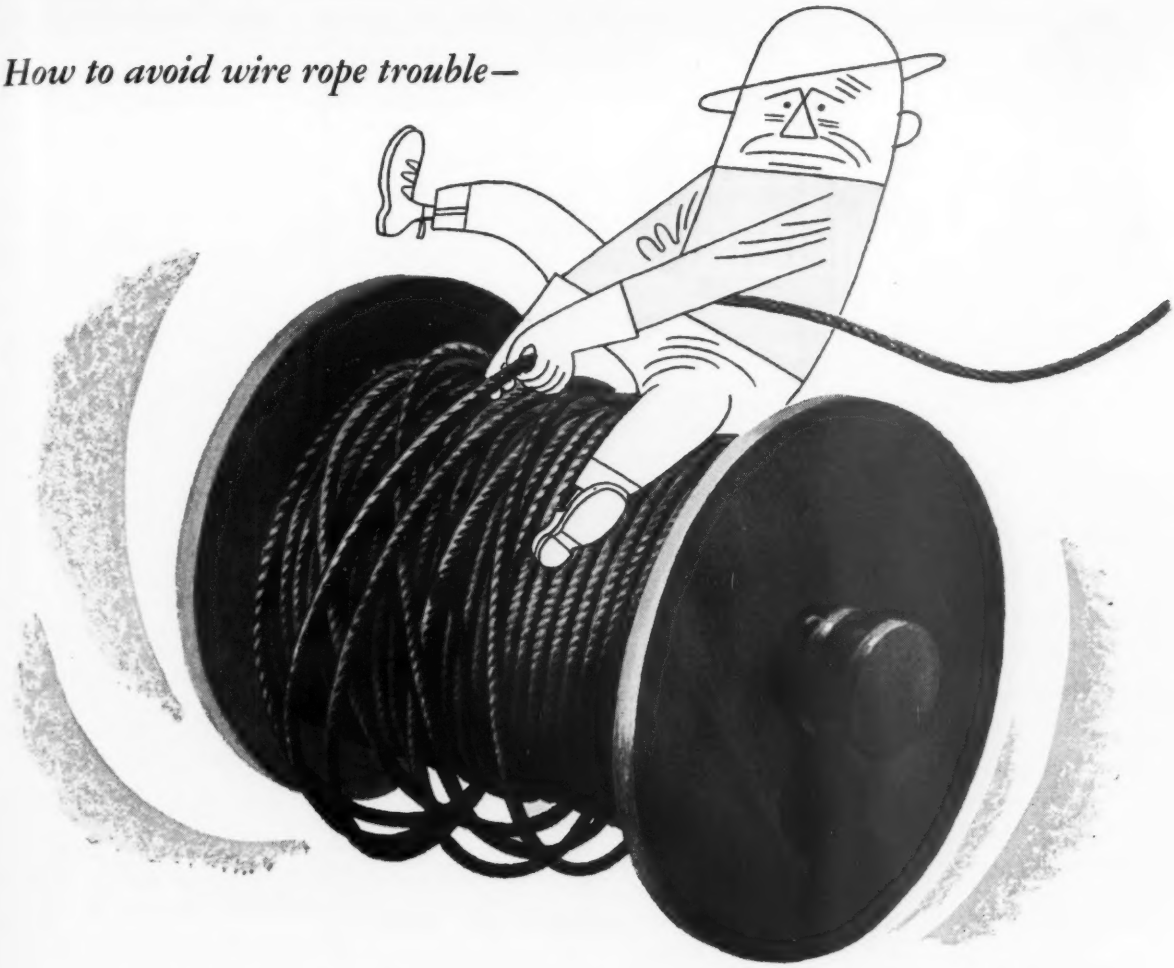
It's a Bright Idea to keep felt always in mind, for factory processes and equipment, and for finished products of all kinds. No matter what you make, or are designing, remember that felt can polish, seal, lubricate, control vibration and noise, act as a filter, do many other tasks with efficiency, economy and long life. American supplies felt of all types, in rolls, sheets, and parts cut to your dimensions, ready for assembly. If you will tell us what you make, we will consult with you and provide technical information.

FREE! Write on your letterhead for special folder, "S.A.E. Felts." Contains samples and standards.

American Felt Company
TRADE MARK ®

GENERAL OFFICES: GLENVILLE ROAD, GLENVILLE, CONN. PACIFIC COAST: A. B. BOYD CO., 1253 Howard St., San Francisco, also 763 E. 14th St., Los Angeles 21, Calif.; 733 So. E. Union Ave., Portland 4, Ore., 404 Dexter Ave., Seattle 9, Wash. PLANTS: Glenville, Conn.; Franklin, Mass.; Newburgh, N. Y.; Detroit, Mich.; Westerly, R. I. ENGINEERING AND RESEARCH LABORATORIES: Glenville, Conn.

How to avoid wire rope trouble—



Overwinding or crosswinding can cut rope life up to 90%

Because it causes crushing and abrasion, overwinding or crosswinding of rope on the drum greatly reduces rope life. If overwinding can't be avoided, you can reduce spooling problems by checking for undercut drum flanges, improper drum and sheave alignment, or excessive fleet angle. Installation of a "turnback bar", drum grooving, or "line spoolers" may also be profitable.

Most users in the West report less trouble, longer service when they rig up with Tiger Brand Wire Rope. No wonder it outsells all other brands. Want more facts? See your local Tiger Brand Distributor or write United States Steel, 1403 Russ Bldg., San Francisco 6.

USS TIGER BRAND Wire Rope

United States Steel Corporation—Columbia-Geneva Steel Division
In the East: American Steel and Wire Division

UNITED STATES STEEL

April 1955

Vol. XX, No. 4

ARTICLES

WORK SMARTER, NOT HARDER 29
A work simplification program finds better ways to do a job.

CORROSION CAUSES AND CURES 32
Here's an idea of what it is and how to combat it.

TESTING MADE ACCURATE BY FLIGHT SIMULATORS 34
Electrical systems for high-speed aircraft get realistic trials.

PROPANE POWER PROVES CHEAPER 36
Lift truck costs from Douglas bear out earlier results reported by Lockheed.

PLYWOOD PALLETS SHAVE REPAIR BILL 37

WHAT THE WEST IS DOING WITH INDUSTRIAL TELEVISION 38

HOW TO PICK STEAM TRAPS 39
First half of a two-part article. Next month: steam trap installation and maintenance.

REVAMPED PLANT LAYOUT BOOSTS WORKER OUTPUT 44
Face-lifting, roof-raising, rearrangement of facilities, and installation of the latest materials handling equipment makes the difference.

FLUE GAS RECIRCULATION HELPS CONTROL STEAM TEMPERATURE 48
Suitable where there are great variations in plant loadings.

PATENT POLICIES IN WESTERN BUSINESS 53

MOVIE INDUSTRY RAPIDLY RETOOLING 58

DEPARTMENTS

Editorials 16
Letters 18
Calendar of Meetings 20
This Month's Cover 24
Efficiency Kinks 62
New Equipment and Materials 74
Helpful Literature 86
Westerners at Work 94
Associations Elect 99
Trade Winds 100
Classified Advertising 103
The West on Its Way 105

ADVERTISERS IN THIS ISSUE 112

EDITOR
A. C. Prendergast

ASSISTANT EDITOR
Robert S. Wood

MANAGING EDITOR
John J. Timmer

NEWS EDITOR
Mary J. Beneditz

CONSULTING EDITORS

Roy C. Henning
Electricity and Electronics

W. J. O'Connell
Industrial Development Planning

SOUTHERN CALIFORNIA EDITORIAL CORRESPONDENT
Sterling Gleason
1216 W. 76th Street
Los Angeles 44, California

PRODUCTION MANAGER
Patricia N. Mann

CIRCULATION MANAGER
William Melton

Published monthly by

KING PUBLICATIONS, INC.
609 Mission Street
San Francisco 5, Calif.
Phone YUkon 2-4343

James I. Ballard . . . . President
L. P. Vrettos . . V. P. & Treasurer

ADVERTISING SALES

Manager: Roderick V. Pierce

Representatives:

SAN FRANCISCO—Roderick V. Pierce
609 Mission Street
San Francisco 5, Calif.
Phone YUkon 2-4343

LOS ANGELES—Jerome E. Badgley
Vice President
128 So. Mansfield Avenue
Los Angeles 36, Calif.
Phone WEbster 8-8512

PACIFIC NORTHWEST—Arthur J. Urbain
609 Mission Street
San Francisco 5, Calif.
Phone YUkon 2-4343

MILWAUKEE—Richard W. Morey
725 N. 115th Street
Milwaukee, Wisc.
Phone SPring 4-9093

CHICAGO—Gordon H. Gannett
1386 Asbury Avenue
Winnetka, Ill.
Phone ROgers Park 4-4500

CLEVELAND—Robert J. Lick
313 E. 216th Street
Euclid 23, Ohio

NEW YORK—Richard J. Murphy
107-51 - 131st Street
Richmond Hill 19, N. Y.
Phone JAmaica 9-2651

BPA NBP

50c per copy $4.00 per year

Accepted as Controlled Circulation Publication at Los Angeles, California

Copyright 1955 by King Publications, Inc.

SERVING ALL INDUSTRY IN THE NATION'S FASTEST GROWING REGION

High atop Palomar Mountain in Southern California, the world's largest telescope probes the sky in quest of the secrets of the universe.

Known as the Hale 200-inch reflector, the telescope weighs 530 tons, but is so finely balanced and has such friction-free bearings that it can be moved with a 1/12 horsepower electric motor when following a star across the sky from east to west.

Protecting the delicate mechanism which operates the 200-inch telescope are lubricants designed and recommended by General Petroleum's lubrication engineers.

This same specialized service is available to you and your plant's machinery . . . call your nearby G.P. office today for the tops in product and service.

SOCONY-VACUUM

GENERAL PETROLEUM CORPORATION

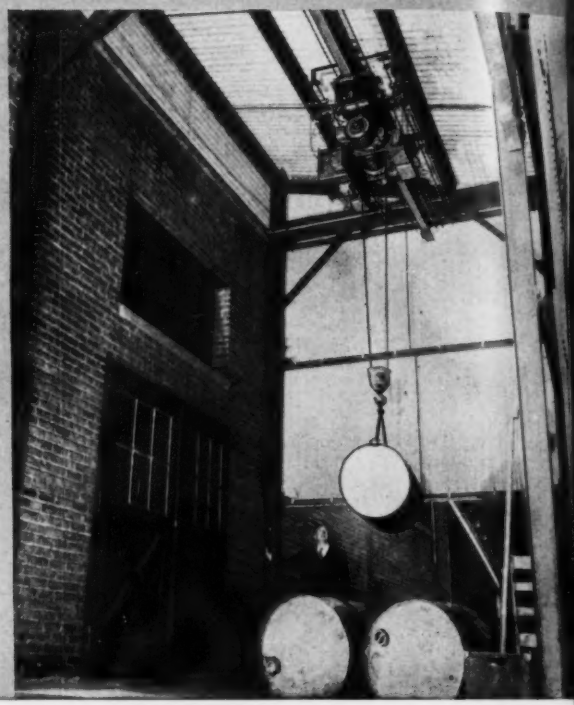
Photograph courtesy California Institute of Technology.

Cuts Die-Handling Time in ½

A large aircraft builder wrote: "Time and handling in this operation have been cut approximately in half by use of the Tramrail. In addition, operators report much greater safety and less danger of personal injury in handling heavy parts."

Automatic System Eliminates Three 10-ton Trucks

The need of three 10-ton trucks to haul materials between buildings was eliminated by a Cleveland Tramrail automatic dispatch system which does the job quickly without attendants accompanying. In addition, many man-hours of working time are saved daily and the load on an elevator is greatly reduced.



OVER 40,000 CLEVELAND TRAMRAIL *NOW SERVE* INDUSTRIAL

NOTE THIS: Regardless of size or type, MOST CLEVELAND TRAMRAIL INSTALLATIONS PAY FOR THEMSELVES WITHIN ONE YEAR—and they keep on paying handsome dividends year after year thereafter.

If you do not have an accurate cost record of all of your manufacturing operations, you may be astounded at the tremendous price you are paying to pick materials up, move and set them down. This may be your biggest expense item.

Illustrated here are a few actual case examples of the great savings and other important advantages

GET THIS BOOK!

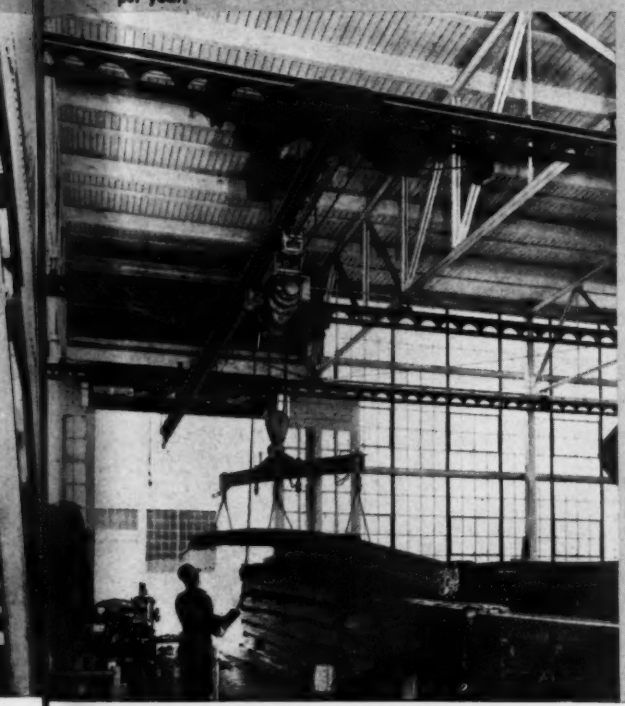
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
8864 East 284th Street Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

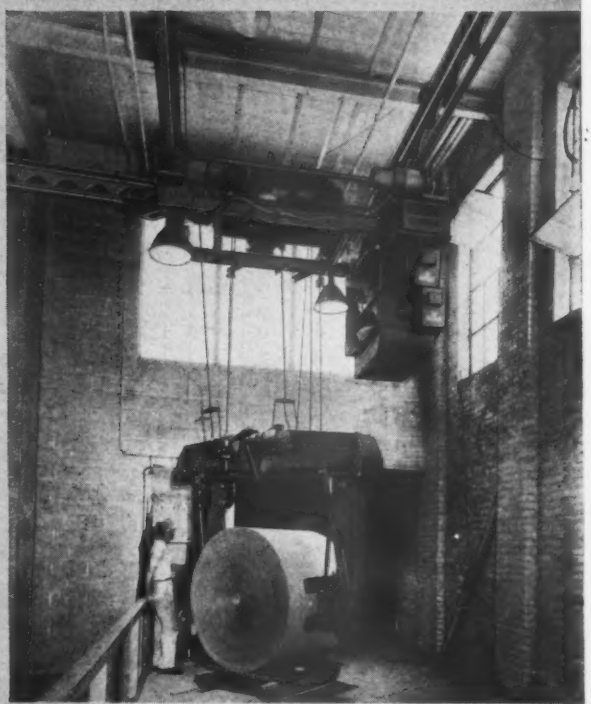
Saves $5,000 Yearly on Steel Cost

A West Coast manufacturer installed a completely motorized 5-ton Cleveland Tramrail transfer bridge that interlocks with an outside track over a railroad siding. Because this enables handling 5-ton bundles, a $2.00 per ton bundling charge is saved on steel purchased. Handling time is also saved. Since 200 tons are used monthly the total savings amount to $5,000 per year.



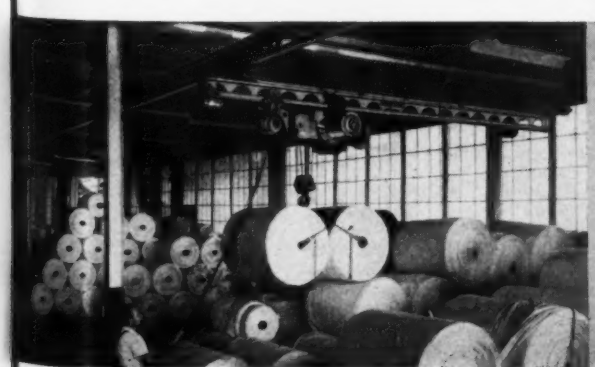
7,500 lbs. Paper Spoilage Saved Daily

Among other important cost-reducing advantages, this cab-operated crane with motorized roll grab in a large paper warehouse, cuts damage losses by 1% of total tonnage handled. Approximately 150 rolls weighing 750,000 lbs. are handled daily.



INSTALLATIONS AMERICA

Cleveland Tramrail has brought about in nearly every industry. Most likely you, too, have materials handling jobs in your plant from which big savings can be made. Why not have our engineers make a study and present recommendations, without obligation, of course?



Foundry Jumps from 3 Heats to 8 Daily

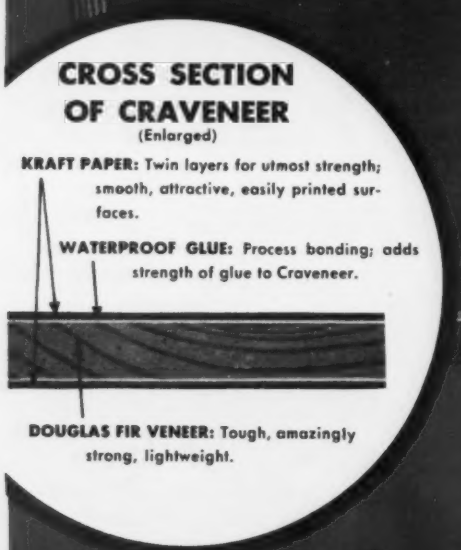
With no increase in man power, the installation of an inexpensive Cleveland Tramrail handpropelled system in a small brass foundry, made a terrific difference in their operations. It made possible 8 heats a day instead of 3, formerly usual. Despite more than double output, the men are less fatigued now at the end of a day.

Increases Roll Storage Capacity 50%

The 400-lb. cloth rolls in foreground could only be piled two high until the Tramrail bridge was installed. Now one man can pile them three high easily. He can also deliver them to other parts of the building on the bridge and overhead track, directly without rehandling, thus cutting cost in this way, too.

Announcing

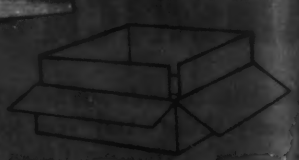
CABCO CRA


CROSS SECTION
OF CRAVENEER
(Enlarged)
KRAFT PAPER: Twin layers for utmost strength; smooth, attractive, easily printed surfaces.
WATERPROOF GLUE: Process bonding; adds strength of glue to Craveneer.
DOUGLAS FIR VENEER: Tough, amazingly strong, lightweight.

Cleated panel box

Turkey box

Tomato lug



Carton stiffener

Wirebound container

Lightweight disposable pallet

CRAVENEER SAVES — for many industries

As a material for containers, or as an integral part of a product, Craveneer has already proved its value in widely varied fields. Just a few of its many time-saving, cost-cutting applications are shown here. A Cabco engineer can explain its properties, help determine how Craveneer can be of greatest value to your company.

RAVENEER®

PATENTED

NEW multi-purpose container material combines best features of paper and wood

Job-proven paper-and-wood laminate • Stronger than paper, lighter than wood • Smooth, attractive surface—both sides • Easily printed, formed or die-cut Can be sawed, nailed, stapled, glued • Resists water; ideal for iced produce shipments Varied thicknesses; standard or special sizes

Introduced in the West by Cabco, amazing new Craveneer is composed of tough, Douglas Fir veneer, laminated both sides with heavy duty Kraft paper. Waterproof glue and special processing produce a strong, enduring, easily handled material ideal for shipping containers and many other industrial applications.

Cabco Craveneer is supplied in four core thicknesses 1/12", 1/10", 1/8" and 1/6" with heavy duty 42 lb. Kraft paper. Craveneer can be accurately pre-cut to sizes fitting your requirements, or supplied in standard sheets.

Request a sample and complete information. Very possibly, Cabco Craveneer can effect important packaging or manufacturing savings for you.

GET SAMPLE, COMPLETE DETAILS

Craveneer is another "first" from
CALIFORNIA BARREL CO., LTD.
Since 1883 the West's pioneer manufacturer of wooden shipping containers.

Cabco products are sold exclusively through

DUFF CALIFORNIA CO.

100 BUSH STREET, SAN FRANCISCO 4, SUTTER 1-2260
2581 EAST EIGHTH STREET, LOS ANGELES 23, ANGELUS 1-4161
501 DOOLY BUILDING, SALT LAKE CITY 1, TELEPHONE 3-5962

3359

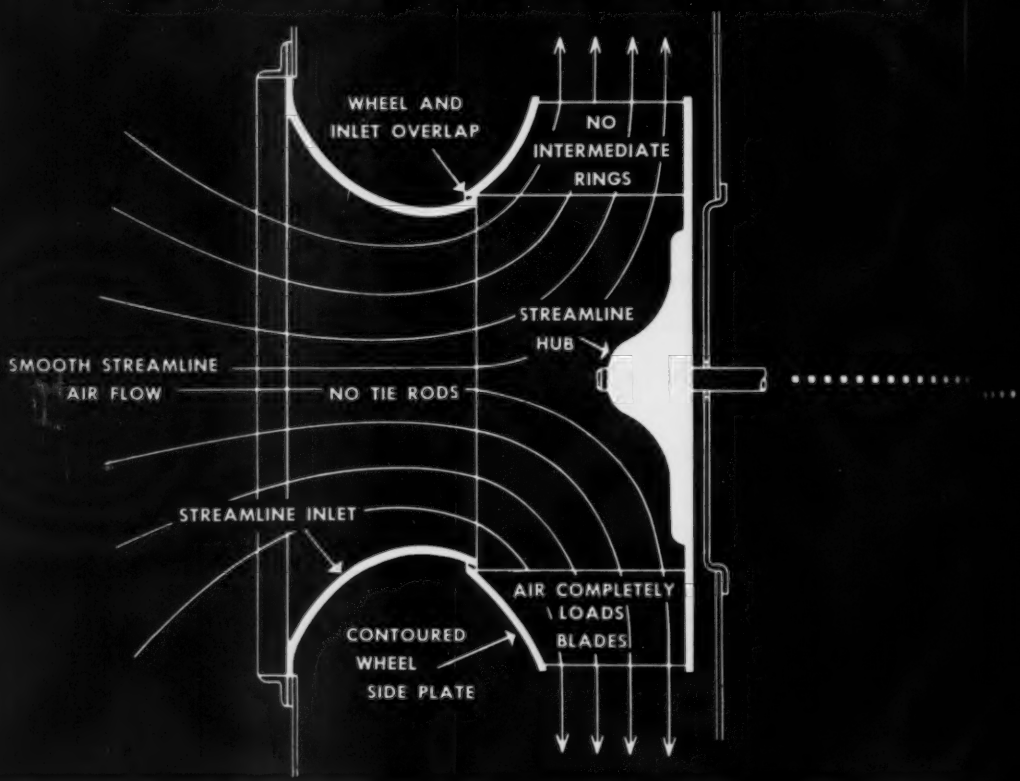
DUFF CALIFORNIA CO.
DEPT. A, 100 BUSH STREET, SAN FRANCISCO 4

☐ Please send Craveneer sample and information
☐ Please have field engineer call

NAME_____
COMPANY_____
STREET_____
CITY_____ ZONE____ STATE_____

Fact:

Westinghouse Aerodynamic Fan Line More Efficient,



MECHANICAL EFFICIENCY 86%...
STATIC EFFICIENCY OVER 80%

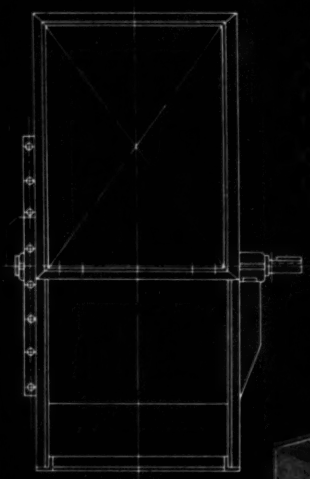
With unobstructed airflow through the wheel in all sizes, the "Silentvane" fan line also offers these other practical advantages:

1. **True self-limiting horsepower characteristic**
2. **Peak horsepower developed in normal selection range**
3. **Quiet, stable operation**
4. **Sharply rising pressure characteristic throughout normal performance range**

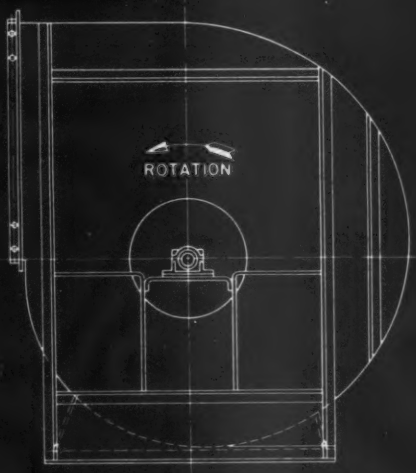
WIDE RANGE OF APPLICATION

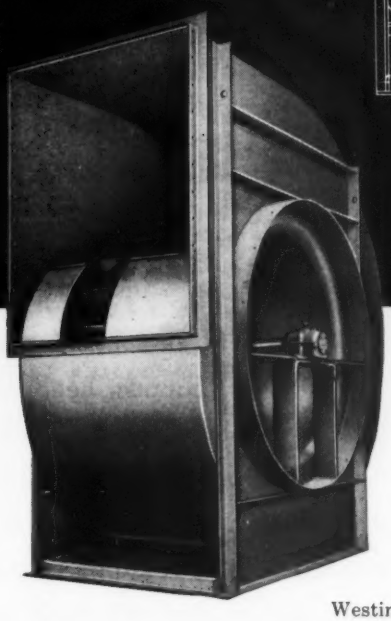
Handling from 600 to 500,000 cfm, the performance-proved Westinghouse "Silentvane" fan line provides an almost unlimited choice of air moving equipment. Coupled with Westinghouse-Sturtevant power-saving Vane Control, "Silentvane" fans offer precise control of air volume at optimum efficiencies. In smaller sizes, 36" and under, fan arrangements are convertible.

Research Makes "Silentvane" Quiet, Non-Overloading



Rugged housing construction and angle iron bracing prevents vibration . . . means quieter operation.





AIRFOIL BLADING AVAILABLE

. . . where quiet operation and power evaluation are prime considerations—
65% less noise intensity . . .
92% mechanical efficiency.

MORE FACTS?

Call your nearest Westinghouse-Sturtevant Sales Engineer . . . he's the "Man with the Facts" on heating, air handling, and electronic air cleaning . . . or fill in the coupon below.

WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE . . . IF IT'S Westinghouse

J-80437

Westinghouse Electric Corp.
Sturtevant Division, Dept. 2C
Hyde Park, Boston 6, Mass.
I'm interested in your new booklet. Send me a copy right away.

NAME AND TITLE.....

COMPANY.....

CITY.....STATE.....

360° hoist hook service...

Here's the answer to economical local handling service to process machines, particularly beneath heavy mill type cranes... it's the American MonoRail Pedestal Jib. These jibs are recommended for capacities between 500 to 4,000 pounds, headroom 9 and 12 feet, and boom length 8 and 12 feet... a truly precision built, skillfully engineered job. Turn to American MonoRail for any overhead handling requirements. Your American MonoRail engineers will be glad to consult with you.

For any MonoRail application write for Bulletin C-1

AMERICAN OVERHEAD HANDLING EQUIPMENT

AMERICAN MONORAIL COMPANY

13117 ATHENS AVENUE • CLEVELAND 7, OHIO

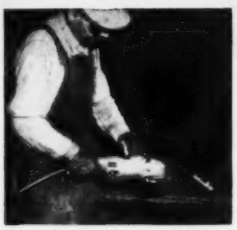
[IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.]

SKIL'S Versatile New Disc Sander Pays Its Way on 101 Jobs!

One easy handling tool for all day long operation on special jobs, in tight places

You'll be able to whip literally scores of jobs with SKIL's new 852 Sander. No matter what your product or problem, if grinding, sanding, or polishing is involved . . . SKIL is your answer. Just look at the advantages:

- **Quick Changeover** of accessories permits easy switching from job to job including sanding, grinding, buffing, wire brushing.
- **Faster Working!** 30% more power increases speed; gets maximum operating efficiency from various accessories.
- **Easier Handling!** New compact design results in shorter length and lighter weight. Special rubber gear cushion makes for quieter, cooler running.
- **Lower Maintenance!** Large commutator and inspection port permits frequent easy cleaning and checking. Improved design increases resistance to wear.



Grinding heavy weld bead with SKIL sandpaper discs.

Used with sandpaper discs, SKIL sander quickly removes stencil marks from crates to permit re-use.

Grinding casting with SKIL cup grinding wheel. SKIL cup wheel guard attaches directly and easily to sander.

These Big Features Make SKIL Your Best Buy in Disc Sanders!

- **IMPROVED MOTOR . . . gives 30% more power!**
- **PRECISION-CUT GEARS . . . for smoother operation!**
- **FRONT HANDLE . . . positioned for better control!**
- **TOOL REST . . . for added convenience!**
- **CORD PROTECTOR . . . for greater safety!**
- **REAR HANDLE . . . contoured to fit the hand!**
- **TRIGGER SWITCH . . . for greater comfort in use!**
- **INSPECTION PLATE . . . for easier cleaning!**
- **SPINDLE LOCK . . . makes accessory changes far easier!**

FREE! Let Your SKIL Distributor Show You in a Convincing Demonstration and FREE Trial . . . that "SKIL is the Answer" to Your Metal Finishing Bottlenecks!

SKIL
PORTABLE TOOLS

Made only by SKIL Corporation
formerly SKILSAW, Inc.
5033 Elston Avenue, Chicago 30, Illinois
3601 Dundas Street West, Toronto 9, Ontario
Factory Branches in All Leading Cities

Mail this Coupon—NOW!

SKIL Corporation, Dept. WI-45
5033 Elston Avenue, Chicago 30, Illinois

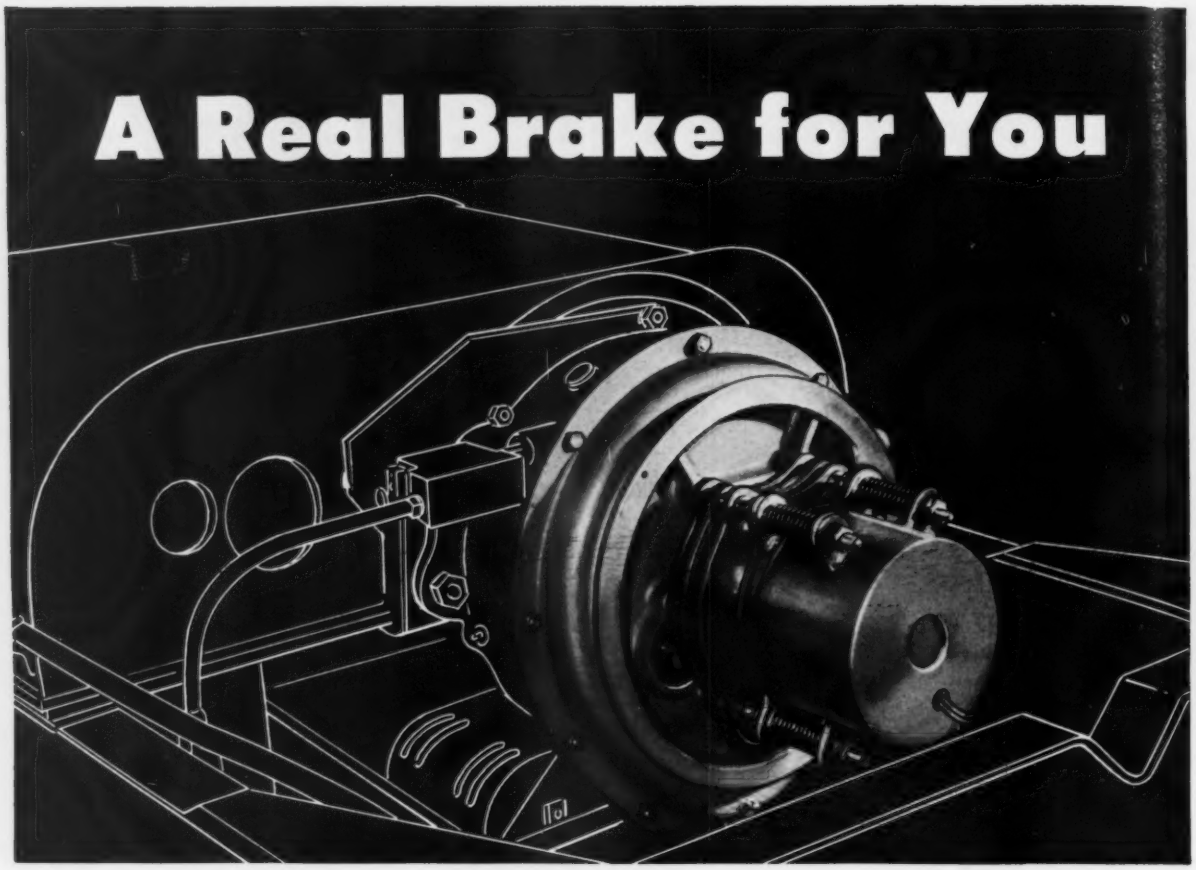
☐ I would like a SKIL demonstration and free trial
☐ Please send me literature on SKIL Sanders and Grinders

Name_____

Address_____

City_____ Zone____ State_____

A Real Brake for You

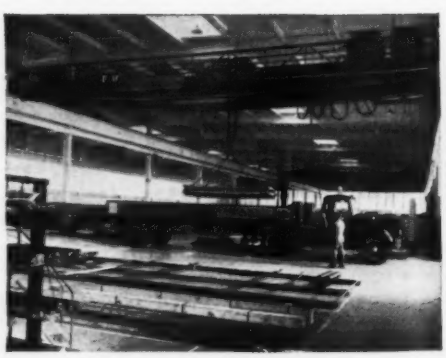


now yours on P&H Trav-Lift Cranes
Rectifier Brakes to end all AC Brake Troubles

Whichever your power, braking is always DC. Action is smooth, instantly responsive, as only 1/32" movement is required to open the brake. In the entire brake there is only *one* simple adjustment.

Ended forever are costly AC brake problems . . . the headaches you're living with right now. No flared laminations . . . No coil failures due to improper armature seal . . . No linkage troubles; there is no linkage.

Sound good? It is good . . . and only the P&H Trav-Lift Crane offers this new rectifier brake. It's another P&H advantage . . . the result of the entire crane-building job by P&H, electrical equipment included . . . to give you what's new and better in cranes. P&H Pacific Division, Harnischfeger Corporation, 2400 East Imperial Highway, Los Angeles 59; 100 Bush St., San Francisco; 2909 First Ave., South, Seattle; 1108-15th St., Denver.



HARNISCHFEGER

SEE THE TRAV-LIFT "IN YOUR OWN WORK."

New bulletin has picture sections showing Trav-Lift cranes in all services, tells about P&H Rectifier Brakes and other features. For all handling jobs up to 20 tons, floor or cage control. Ask for Bulletin C-51.

the P&H *Line*

TRUCK CRANES · DIESEL ENGINES · POWER SHOVELS · PREFABRICATED HOMES · HOISTS · SOIL STABILIZERS · WELDING EQUIPMENT · OVERHEAD CRANES

ANNOUNCING . . .

Every step is safer with . . .

NEW DU PONT SAFETY FLOOR WAX

fortified with anti-slip LUDOX® (colloidal silica)

Gives superior slip resistance
Plus beauty, protection and long wear

HERE'S WHY DU PONT SAFETY FLOOR WAX MAKES EVERY STEP SAFER! "Ludox," the amazing anti-slip ingredient in Du Pont Safety Floor Wax, is colloidal silica; tough, transparent particles of minute size. Under the pressure of a footstep, these particles are pushed into the larger, softer wax globules. This action absorbs much of the foot's forward-moving energy—gives positive traction underfoot!

For offices, schools, hospitals, stores, restaurants and other public buildings Du Pont Safety Floor Wax is offering a new measure of anti-slip security. *And* it gives this vital added protection with no sacrifice in beauty, washability and extra-long life!

A premium slip-retardant wax, Du Pont Safety Floor Wax is suitable for linoleum, asphalt tile, rubber tile, vinyl tile or any other resilient floor covering. It's water-resistant—dries to a satin gloss in 20 minutes, buffs to a high shine. Can be damp-mopped and buffed again and again with no loss in anti-slip protection! Investigate Du Pont Safety Floor Wax today!

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . .
THROUGH CHEMISTRY

★ 1 GALLON ★ 5 GALLONS
★ 30 GALLONS ★ 55 GALLONS

DU PONT SAFETY FLOOR WAX

For Industrial and Institutional Floor Maintenance

Available through a Du Pont Floor Wax distributor in your area.
For name of nearest source write Du Pont Co., Specialties Sales, Wilmington, Del.

Western Industry

EDITORIALS

Using your right of way

IT IS undeniably news that the Southern Pacific is going into the pipeline business by incorporating a subsidiary to build lines for petroleum products from both Southern California and El Paso to serve Arizona. As President Russell put it, the Southern Pacific considers itself a transportation company, not necessarily just a railroad.

To us the most significant aspect of this announcement is the use for the most part of Southern Pacific right of way to accommodate the pipeline. It sounds like belated recognition that the most important thing a railroad possesses is its right of way, a strip not sacred to trains alone but available for anything to which it may be suited. There could be many future ramifications of this possibility.

How many other businesses have an unused, or only partially used "right of way?" How many companies limit themselves to one product or service, instead of realizing that they can be of far greater service and entitled to more profit by fully utilizing their right of way?

Organization charts

ORGANIZATION CHARTS are good as far as they go, but most of the time they seem to stop at middle supervisory levels, instead of penetrating all the way down to the bottom.

For example, when some individual of long service retires or goes elsewhere, how often are his duties (or, to put it another way, the empire he has built up for himself) clearly written down so a successor can carry on without interruption. How often does it have to be said afterward, "Joe took care of all that when he was here," without anyone knowing just how or when Joe did it?

How many plants have lubrication charts applying to personnel and equipment? Or maintenance charts of any kind, for that matter? It may sound like unnecessary paperwork, but how well it pays off in time of need!

P. S. We're going to start preparing an editorial job chart right away. It costs money to have the office phone you about some detail when you are in Seattle or San Diego, instead of at your desk in San Francisco, no matter how cheap the telephone company insists long distance is.

The hats they wear

IF ONE OF OUR best-known Western labor leaders (name him if you choose) became the president of one of our largest Western corporations, would management then find him honorable, cooperative, courteous? Would his own union then discover that he was undependable, aggressive, opinionated?

If someone equally prominent on the management side of the fence abandoned his business and took over this labor leader's job, would management then describe him as argumentative, self-seeking, unreliable? Would the union suddenly find him fair-minded and considerate?

"Ridiculous!" is the unanimous answer. Yet Mason Haire, psychology professor at the University of California, ran a test with 76 members of a central labor council and 108 industrial relations or personnel men from plants or employers organizations in the San Francisco Bay area that contains considerable food for thought.

His test material consisted of two pictures chosen to represent "ordinary people," with a brief personal description. In half the cases the description was juggled so that it did not sound like the identical man. In half the cases the man pictured was described as the manager of a branch manufacturing plant; in the other half as secretary-treasurer of his union.

After one minute to study the picture and description, the participants were given a list of 290 adjectives relating to personality and told to check all those applying to the man in the photograph.

The result? Simply this: if you're on our side you're a pretty good boy; if you're on the other, we don't like you so much. Said Professor Haire, "One would hardly know the same people were being described unless one had seen that it was a single picture and a single set of facts . . .

"It seems clear that a single person looks very different depending on whether he is seen as a manager or a union secretary. Moreover, the nature of this difference depends on whether he is thus seen *by* a manager or a union man."

There Is Only One Rust-Oleum. It Is Distinctive as Your Own Fingerprint.

Actually see Rust-Oleum applied directly over sound rusted surfaces in your own plant.

Get proof of performance right in your own plant! See Rust-Oleum 769 Damp-Proof Red Primer applied over *your own* rusted metal after simple scraping and wire-brushing to remove rust scale and loose rust. Rust-Oleum's specially-processed fish oil vehicle *penetrates* rust to bare metal—saving time, labor, and money. Colorful Rust-Oleum finish coatings in Aluminum, Gray, White, Black, Orange, Blue, Yellow, Green and others provide both *Rust Prevention* and *Decorative Beauty!* Specify Rust-Oleum for new construction, maintenance, and remodeling. See Sweet's for complete catalog and nearest Rust-Oleum Industrial Distributor, or clip coupon to your business letterhead.

RUST-OLEUM

STOPS RUST!

RUST-OLEUM CORPORATION
2526 Oakton Street • Evanston, Illinois

ATTACH TO YOUR BUSINESS LETTERHEAD AND MAIL TO: Nearest Rust-Oleum Distributor Shown at Right

- ☐ **Please Show Me the Rust-Oleum "Rusted Panel Demonstration."**
- ☐ **Test Application of Rust-Oleum Over Rusted Metal Surfaces in My Plant.**
- ☐ **Complete Literature with Color Chart.**

Contact Your Nearest Rust-Oleum Distributor Today!

ARIZONA

Alemite Stewart-Warner
326 N. Third Avenue
Phoenix

CALIFORNIA

Barnes & Delaney
Atlantic & Willow Streets
Long Beach
Phone: Long Beach 4-1647

Ralph-Pugh Co., Inc.
530 Howard Street
San Francisco

Republic Supply Co.
2600 S. Eastland Avenue
Los Angeles
Phone: PArkview 8-7151

Republic Supply Co.
1919 Williams Street
San Leandro
Phone: Lockhaven 2-0414

Sacramento Rubber Co.
721-723 "J" Street
Sacramento
Phone: Gilbert 2-3847

Valley Foundry & Mach. Works
2718 E Avenue
Fresno
Phone: 3-6135

COLORADO

George Brothers
973 Broadway
Denver
Phone: Tabor 5-8747

Stickney's, Inc.
Ft. Morgan

Union Supply Company
P.O. Box 6735 Stockyards Station
Denver
Phone: Alpine 2091

IDAHO

Western Equipment Company
4009 Fairview Avenue
Boise

OREGON

Standard Supply Company
934 S.E. Sixth Street
Portland
Phone: Vermont 2167

UTAH

Williamsen Body & Equip. Co.
933 Wall Street
Ogden

Industrial Supply Company
121-135 Social Hall Avenue
Salt Lake City

WASHINGTON

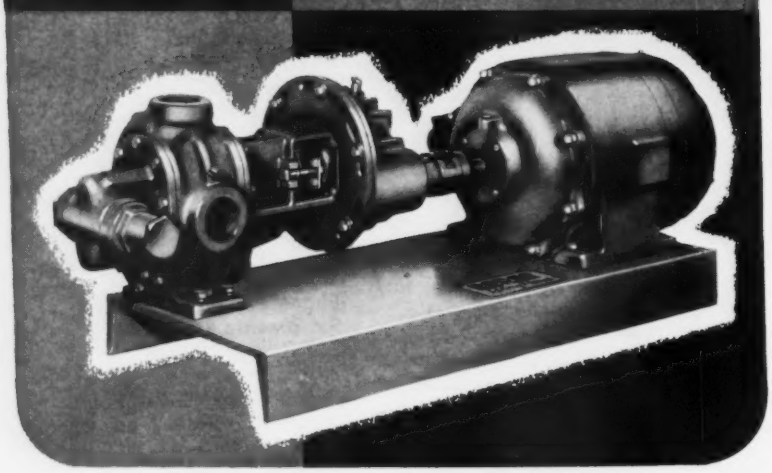
E. H. Holm & Company
1016 First Avenue, S.
Seattle
Phone: Kenwood 5030

QUALIFIES FOR THE JOB ON MANY COUNTS

ROPER

SERIES 3600

PUMP



If you have a job open for a pump, then by all means consider the Roper Series 3600 as the heart of your fuel transfer system. Designed to handle thin or thick liquids quickly and safely, these pumps offer you the many advantages of the rotary gear principle, plus a most important benefit — Roper *dependability.* There is a size for your needs, as models are available from 40 to 300 G.P.M. sizes — pressures to 60 P.S.I.

Check AND COMPARE THESE FEATURES

- ☑ **Compact** . . . requires minimum of installation space.
- ☑ **Indoors or Outdoors** . . . no pump house needed.
- ☑ **Gear Reduction** . . . totally enclosed and running in oil. Three gear ratios available.
- ☑ **Anti-Friction** bearings throughout gear reduction.
- ☑ **Steel Bed Plate** provides rigid foundation for pump and motor.
- ☑ **Operation** . . . unusually smooth and quiet; pump operates in either direction.
- ☑ **Suction Lift** . . . up to 15 feet at 60 P.S.I.
- ☑ **Helical Gears** . . . run in axial hydraulic balance. Pump fitted with 4 high-lead bronze bearings; split-type gland.

See Your Roper Distributor or Write for Catalog

GEO. D. ROPER CORPORATION
Pacific Coast Office, Pump Division
2011 S. Santa Fe Avenue
Los Angeles 21, California

ROPER
Rotary Pumps

LETTERS

Contributions to this column from our readers are welcome. Names will be withheld from publication if requested. Unsigned letters will be disregarded.

"Who does what" request

Editor, WESTERN INDUSTRY:

In the October issue of your magazine we read with interest the article, "Who Does What in the Small Plant?", Part 2 of an industrial management survey, and ask that you either forward a copy of the magazine containing this article or a reprint of of the article.

W. C. THOMPSON
Production Manager
Electronic Products Corp.
Santa Barbara, Calif.

Executive hunting

Editor, WESTERN INDUSTRY:

It would be appreciated if you could forward to me a copy of your article entitled "How To Choose Your Next Executive" which was included in the May 1954 issue of your publication.

R. C. HOLT
Senior Proposal Engineer
Pacific District Office
Peerless Pump Division
Food Machinery and Chemical Corp.
Los Angeles

. . . Of lasting value

Editor, WESTERN INDUSTRY:

Please forward a copy of your article "Plants in the City; Offices in the Country" of December 1952, and bill accordingly.

ROBERT A. DEUTSCH
2742 Hudson Blvd.
Jersey City 6, N .J.

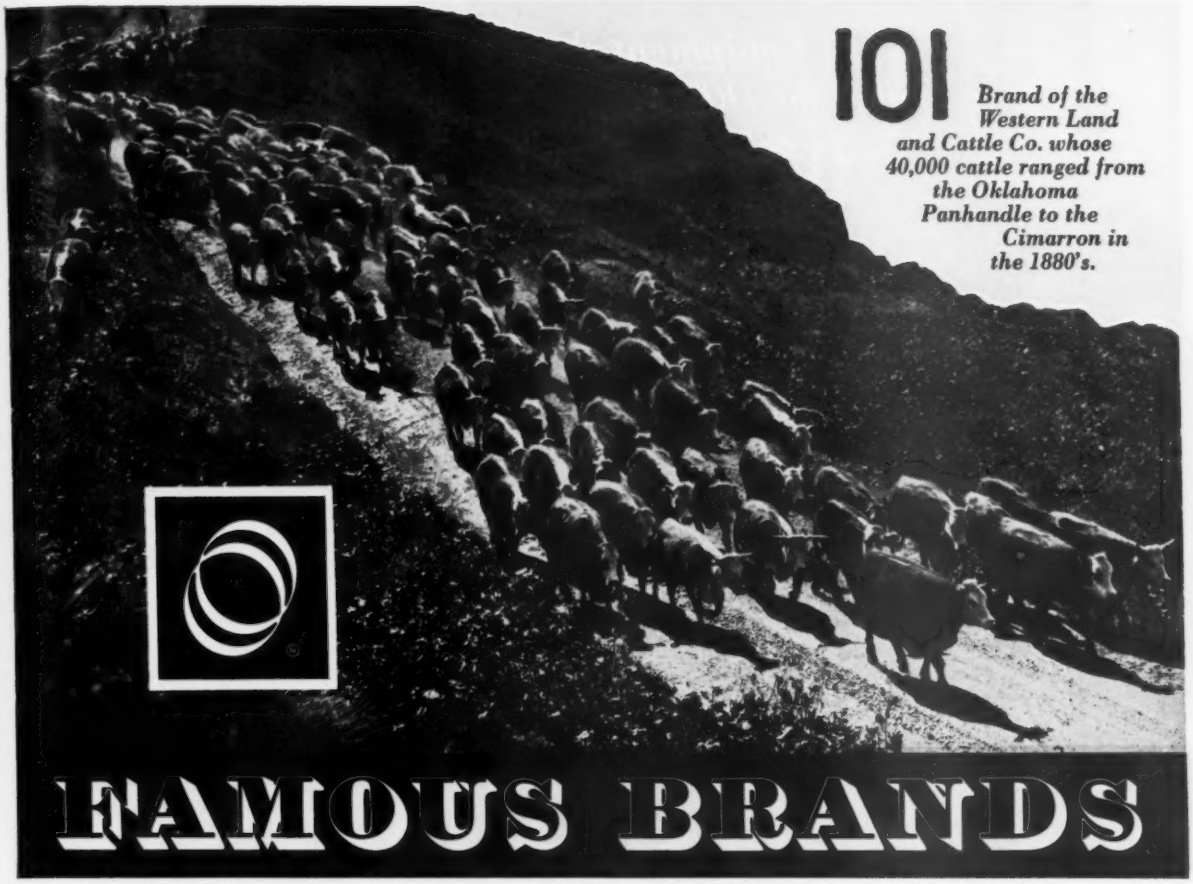
Decade of opportunity

Editor, WESTERN INDUSTRY:

We understand that your publication has reproduced selections from the over-all study of "Decade of Opportunity," prepared by the Western Division Office of the National Association of Manufacturers.

If available, I would appreciate your sending me a copy of such material.

HARMON E. SNOKE
Executive Vice President
Manufacturers Assoc.
of the City of
Bridgeport, Conn.


101
Brand of the Western Land and Cattle Co. whose 40,000 cattle ranged from the Oklahoma Panhandle to the Cimarron in the 1880's.
FAMOUS BRANDS

CHICAGO-LATROBE TWIST DRILLS AND REAMERS

distributed in the Southwest by **GARRETT SUPPLY**

High-quality, precision Chicago-Latrobe drills and reamers give you "more holes per grind" whatever you're machining, from cold-rolled steel to titanium. Reamers are held to industry's closest tolerances. Garrett Supply has the largest stock of these fine tools in the West, including many specials.

Garrett's trained cutting tool specialists are available to help with your cutting problems. Don't hesitate to call on us.

The Garrett Supply Company stocks more than 100 famous brands of tools and industrial supplies. That, and our prompt service, is why you fill your needs faster when you "Get it from Garrett!"

HEADQUARTERS IN SOUTHERN CALIFORNIA AND ARIZONA FOR THESE AND OTHER FAMOUS BRANDS

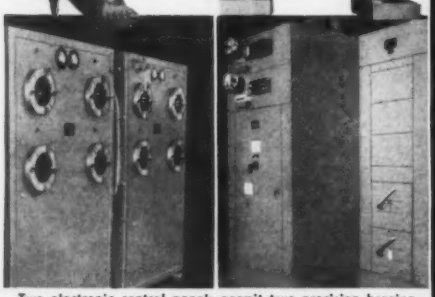
J. H. Williams & Co.
Boston Gears
Black & Decker
Starrett Precision Tools
J. Wiss & Son
Kennedy Tool Boxes
Millers-Falls Tools

IN LOS ANGELES **Klmball 7221**
IN PHOENIX **ALpine 3-6104**

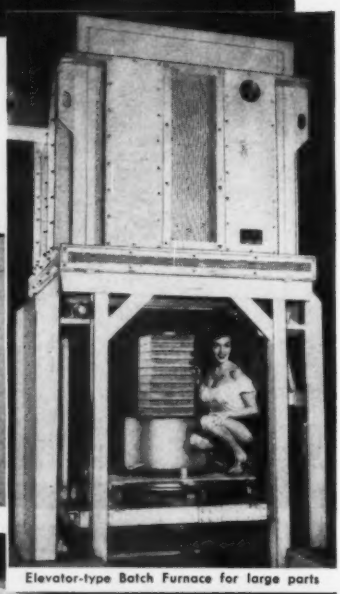
GARRETT SUPPLY COMPANY

3844 South Santa Fe Ave., Los Angeles 58, California
130 West Madison St., Phoenix, Arizona

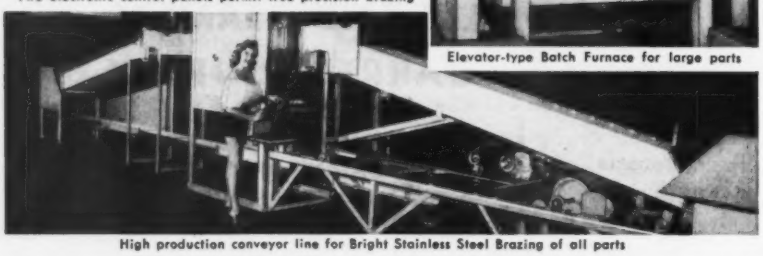
a division of **THE GARRETT CORPORATION**



Two electronic control panels permit true precision brazing



Elevator-type Batch Furnace for large parts



High production conveyor line for Bright Stainless Steel Brazing of all parts

Now in operation—the LARGEST, Finest, Newest HYDROGEN FURNACE BRAZING INSTALLATION In The West! **Bright Stainless Steel Brazing • Nickel-Alloy Brazing • Hi-Temperature Silver Brazing**

It's the EQUIPMENT that counts... in furnace brazing too! That's why we've invested $100,000.00 and installed *two* brand new controlled atmosphere Hydrogen Brazing Furnaces. One—a high-production *Bright Stainless Steel Brazing* conveyor unit and the other—the biggest elevator type batch furnace available. NOW... we can braze larger parts than ever before (up to 24" dia. and 24" high—and weight to 2000#). We've got the equipment to do the job—won't you let us show you how it can produce for you!

Phone or Write for complete data file— Dept. WI

METAL FABRIFORM PRODUCTS

FABRIFORM METAL PRODUCTS

Division of George Getz Corporation

7720 Male Ave. • Los Angeles 1, Calif. • Kimball 9261

CALENDAR OF MEETINGS

APR. 13-15—*Northwest Light and Power (Engineering and Operating Section)*, Davenport Hotel, Spokane. Contact Washington Water Power Co., Spokane.

APR. 18-20—*National Air Pollution Symposium*, Huntington-Sheraton Hotel, Pasadena, Calif. Contact Dr. A. M. Zarem, Stanford Research Institute, 621 S. Hope, Los Angeles.

APR. 19-20—*33d Pacific Coast Management Conference*, Claremont Hotel, Berkeley, Calif. Contact Everett Van Every, President, California Personnel Management Assoc., 2180 Milvia St., Berkeley 4. Calif.

APR. 19-20—*Northwest Wood Products Clinic*, Davenport Hotel, Spokane. Contact Everett Ellis, secretary, Box 291, University Station, Moscow, Ida.

APR. 20-22—*American Management Assoc.* orientation seminars, Hotel Ambassador, Los Angeles. Contact Seminar Registrar, AMA, 300 W. 43rd St., New York 36.

APR. 22-23—*American Institute of Industrial Engineers, Inc.*, Western regional conference, Statler Hotel, Los Angeles. Contact Los Angeles Chapter Office, P. O. Box 25524, Los Angeles 25.

APR. 25-27—*American Management Assoc.* workshop seminars, Hotel Ambassador, Los Angeles. Contact Seminar Registrar, AMA, 300 W. 43rd St., New York 36.

APR. 28-29—*Institute on Operations Research for Business and Industry*, Los Angeles Campus of University of California. Contact Engineering Extension Office, 3116 Engineering Bldg., U. of C., Los Angeles 24, or phone BRadshaw 2-6161, ext. 307.

APR. 28-30—*American Institute of Mining & Metallurgical Engineers*, Pacific Regional conference, Davenport Hotel, Spokane. Contact Dr. F. R. Morral, c/o Spokane Chamber of Commerce, or telephone WA 1541, ext. 43.

MAY 4-6—*Conference on uses of light metals in new products*, Washington State College Campus, Pullman. Contact Division of Industrial Services, WSC, Pullman.

MAY 8-10—*Pacific Northwest Trade Assoc.* spring conference, Hotels Vancouver and Georgia, Vancouver, B. C. Contact Association office, Vance Building, Seattle 1, Wash.

MAY 9-11—*Metal Treating Institute*, Ambassador Hotel, Los Angeles. Contact Metal Treating Institute, 271 North Ave., New Rochelle, N.Y.

MAY 11-13—*Pacific Coast Electrical Assoc.*, regional convention, Palace Hotel, San Francisco. Contact Victor Hartley, Executive Secretary, 50 West 16th St., Los Angeles 14.

. . . More on page 22

A completely new and different

PAYLOADER®

TRACTOR SHOVEL

NEW MODEL HA

An efficient, more flexible bulk-material handling system

The first Model HA "PAYLOADER" tractor-shovel appeared 15 years ago, giving industry a new, flexible bulk-material handling system. Today, Model HA's are *the* bulk-handling system in thousands of plants.

Now comes the 1955 Model HA — a completely new design — with twice the digging power, lifting capacity and carrying capacity and 50 to 100% greater production capacity.

Whether or not you have older HA's — you should find out how this new HA can reduce your bulk material handling costs. Your "PAYLOADER" Distributor is ready to show you.

Outstanding features:

16⅔% more bucket capacity:
PAYLOAD capacity ..... 18 cu. ft.
Struck-load capacity ..... 14 cu. ft.

Powerful "break-out" digging action Upward rotation of the bucket combines with forward motion of machine in a powerful slicing action that gets full loads quickly, even from lumpy, sticky or heavy materials.

Bucket tip-back of 40 degrees when only 6 inches off the ground carries heaped loads *low* and *close* for maximum stability, balance and safety.

New standards of safety Boom arms and parts are mounted *low* and carry loads *low* and are always clear of the operator. Operator visibility is good at all times.

Advance-design hydraulic system includes: sealed, pressurized hydraulic tank — no breathing of dirt and grit into hydraulic fluid; hydraulic accumulator prevents pressure shocks — gives easier, safer control.

Torque-converter drive and full-reversing transmission with two speed ranges insures fast moves in either direction — easier operation and control — more production.

GAS OR DIESEL POWER OPTIONAL.

THE FRANK G. HOUGH CO.
[illegible]

- ☐ Send me complete model HA information
- ☐ Send information on all seven "PAYLOADER" sizes
- ☐ Send name of my "PAYLOADER" Distributor

Name .....

Title .....

Company .....

Street or Box No. .....

City ..... State .....

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. • LIBERTYVILLE, ILL.
SUBSIDIARY INTERNATIONAL HARVESTER COMPANY

CM Lodestar®

ENTIRELY NEW
differently NEW

FLEXIBLE LINK CHAIN

PUSH-BUTTON CONTROL

FEATURING:

- Push Button Control
- Self-Adjusting Heavy Duty Brake
- Sealed-in Lifetime Lubrication
- Overload Protection
- Full Enclosed Components
- Lowest Headroom
- "CM-Alloy" Flexible Link Chain

CAPACITIES: from ⅛ to 1 ton. Single and 3 phase. ¼ ton model weighs only 51 pounds.

$149.50 and up

Built to serve you without costly maintenance

Lodestar is the first truly "heavy duty" version of the small electric hoist. The CM Lodestar is designed to operate without costly maintenance or interruptions in your work schedules. The initial cost is practically your only cost with a Lodestar... an extremely low cost indeed!

WRITE US or call your CM distributor for literature, prices and quick delivery from stock.

CHISHOLM-MOORE HOIST DIVISION
Columbus McKinnon Chain Corporation
Tonawanda, New York
REGIONAL OFFICES: NEW YORK • CHICAGO • CLEVELAND
In Canada: McKinnon Columbus Chain Limited, St. Catharines, Ontario

CM HOISTS AND CHAIN

CALENDAR

. . . Begins on page 20

MAY 15-20—*National Tank Truck Carriers* conference, Mark Hopkins and Huntington Hotels, San Francisco. Contact C. Austin Sutherland, managing director, 1424 Sixteenth St. N.W., Washington 6, D. C.

MAY 17-19—*Association of American Railroads (Communications Section).* St. Francis and Sir Francis Drake Hotels, San Francisco. Contact A. H. Grothmann, secretary, 59 E. Van Buren St., Chicago 5.

MAY 22-27—*Mass Spectrometry*, committee meeting of American Society for Testing Materials, Mark Hopkins Hotel, San Francisco. Contact offices of Society, 1916 Race St., Philadelphia 3, Pa.

MAY 26-27—*Electronic Components Conference*, Los Angeles. Contact Dr. Simon Ramo, Ramo-Woldridge Co., 8820 Bellance Ave., Los Angeles 45.

JUNE 6-10—*National Industrial Service Assoc.*, Statler Hotel, Los Angeles.

JUNE 15-17—*American Society of Training Directors*, annual convention, Ambassador Hotel, Los Angeles. Contact Ralph E. Wohlford, Publicity Committee, 15104 El Soneto Dr., Whittier, Calif.

JUNE 19-22—*American Industrial Bankers Assoc.* conference, Fairmont Hotel, San Francisco. Contact Myron R. Bone, vice president, 1208 Lincoln Bank Tower, Fort Wayne 2, Ind.

JUNE 19—JULY 1—*Series of one-week management conferences.* Industrial Relations Section, California Institute of Technology, Pasadena, Calif. Contact Robert D. Gray, Director, Industrial Relations Section, CIT.

JUNE 20-23—*Forest Products Research Society* national convention, Seattle.

JUNE 26-29—*American Society of Heating and Air Conditioning Engineers.* St. Francis Hotel, San Francisco. Contact A. V. Hutchinson, Executive Secretary, 62 Worth St., New York 13.

JULY 12-14—*Second Western Plant Maintenance and Engineering Show and Conference*, Pan-Pacific Auditorium, Los Angeles. Contact Clapp & Poliak, Inc., 759 Monadnock Bldg., San Francisco.

AUG. 24-26—*Western Electronic Show and Convention*, Civic Auditorium and Fairmont Hotel, San Francisco. Contact Mal Mobley Jr., Business Manager, 344 North La Brea Ave., Los Angeles 36.

SEPT. 12-16—*Instrument Society of America*, 10th annual conference and exhibit, Shrine Exposition Hall and Auditorium, Los Angeles. Contact Fred J. Tabery, Fred J. Tabery Corp., 3443 S. Hill St., Los Angeles 7.

SEPT. 16-22—*American Society for Testing Materials*, Pacific Coast Meeting, Hotel Statler, Los Angeles. Contact offices of Society, 1916 Race St., Philadelphia 3, Pa.

SEPT. 25-29—*Master Brewers of America* convention, St. Francis Hotel, San Francisco. Contact Henry Henius, convention chairman, 2601 Newhall St., San Francisco.

National Supply produced this rolling mill gear box assembly

...from design to delivery

This order specified a complete gear box for a rolling mill, with elements housed to provide for 4 take-off shafts. An over-all gear speed ratio of 543 to 1 was required, with a final speed of 1½ RPM on the 4 shafts.

The work started immediately in National's Torrance Plant. Design details were readily completed. Fabrication, machine work and assembly followed according to schedule. With complete facilities for producing such special jobs, National did all of the work under one roof.

The result—a precision-built, heavy-duty gear box, ready for long, dependable action in the customer's mill. And behind this finished product, like hundreds of other special jobs National does for western industry, are three vital ingredients—complete facilities, engineering skill and experienced plant operators. You can quickly put them to work for your needs, with a letter or phone call to the Industrial Products Division.

THE NATIONAL SUPPLY COMPANY

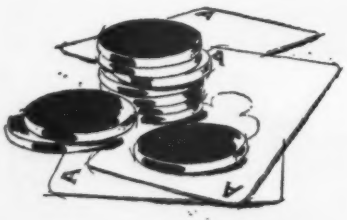
INDUSTRIAL PRODUCTS DIVISION

TORRANCE, CALIFORNIA • LOS ANGELES AREA

Ideal Pressed Steel Forgings • Billets and Large Bars
Steel Castings and Special Machinery

Melting • Forging • Casting • Machining • Heat Treating
Assembling • Welding • Testing

When the



chips are down

Call Santa Fe

Now 100% Dieselized to better handle your freight!

Diesels enable quicker dispatch . . . smoother handling . . . faster schedules. BIG reasons for calling Santa Fe for help with your shipping problems when the chips are down.

There are 61 Santa Fe Offices from 'coast-to-coast' with one in your territory as near as your telephone. Call today.

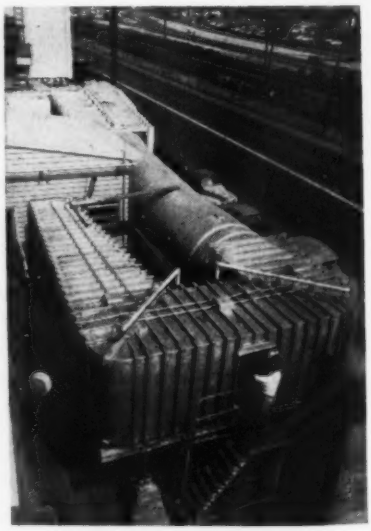
THIS MONTH'S COVER

BLIZZARD TUNNEL storm-tests aircraft

SCIENCE has managed to push back the frontiers and achieve the impossible with astonishing accomplishments year after year, but so far nothing much has been done about the weather. And since the weather is always there to reckon with, scientists at Lockheed Aircraft Corp., Burbank, Calif., have been provided with a blizzard tunnel to study its various effects on today's aircraft.

Temperatures of 35 deg. F. and wind velocities of up to 270 mph. are provided in the doughnut-shaped tunnel now being used to test a number of still secret aircraft—advanced forms of flight now in design and mockup at Burbank. The tunnel is 76 ft. long, 26 ft. wide, and 17 ft. high and cost $160,000.

A 7-ft. diameter fan pushes air from the largest section of the tunnel through refrigerated coils into a small test section. Constant constricton of the air flow speeds velocities from 15 to 270 mph. Nine spray bars introduce water into the cold air current after it moves through the 15x9 ft. refrigerator. By adjusting water, temperature, and air flow from a control booth, high altitude weather conditions can be duplicated.



EXTERIOR view of Lockheed's storm cavern. A technician inspects ice accretion.

USED BY 71%

OF ELECTRIC FURNACE OPERATORS

Permanente PERICLASE Brick for the Steel Industry:

- Permanente Periclase Brick (D-S)
- Permanente Periclase Chrome Brick (PCA)
- Permanente Chrome Periclase Brick (CPA)

Now available! A companion mortar for Permanente D-S brick. High purity periclase composition *and* maximum workability.

Installation advice on request

Permanente Periclase-Chrome Brick is used to line 71% of all basic electric steel furnaces west of the Mississippi River and in all of Mexico—the area where this superior brick has been available for the longest time.

In all other areas where Permanente Periclase-Chrome Brick has more recently been introduced, it is gaining acceptance at an even faster rate.

Of course, there's a reason. It is simply that the special composition of Permanente Periclase-Chrome Brick has greatly lengthened the life of electric furnace sidewalls—by a minimum of 10% . . . and in some operations even up to 200%.

These performance records are derived from a wide variety of shops melting all types of electric steel. No matter what your operation, Permanente brick should lengthen sidewall life.

Your Kaiser Chemicals sales engineer can give you complete technical details on Permanente Periclase-Chrome Brick, and explain why it can lengthen the life of your electric furnace sidewalls. He is available to assist you in its proper installation in your electric furnace.

• • • • • • • • • • • • • • •

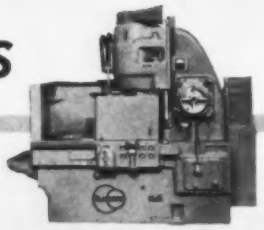
Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, California . . . First National Tower,* AKRON *8, Ohio . . . 518 Calumet Bldg., 5231 Hohman Avenue, Hammond, Indiana* (CHICAGO).

Kaiser Chemicals

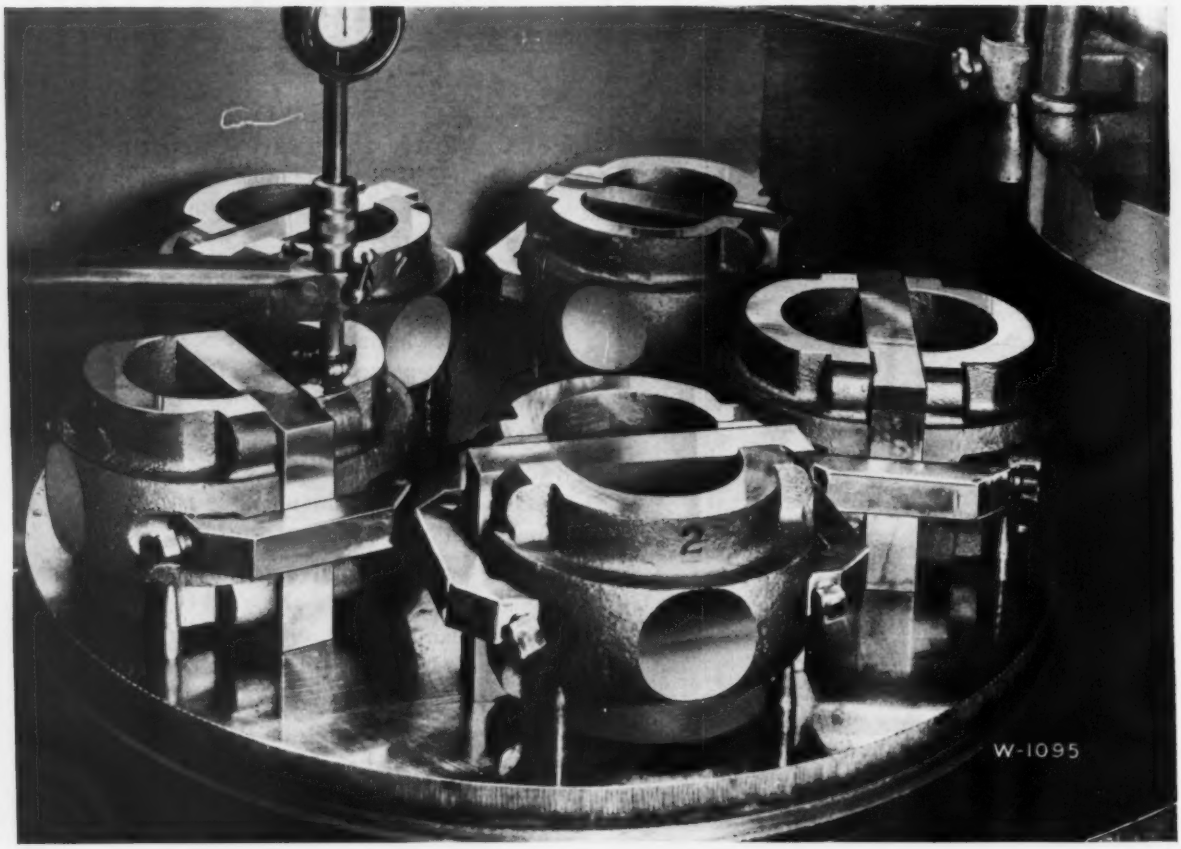
Pioneers in Modern Basic Refractories

Basic Refractory Brick • Ramming Materials • Castables & Mortars • Magnesite • Periclase • Deadburned Dolomite

IT PAYS



TO PUT IT ON A BLANCHARD



The first operation on these cast steel (1504) bearings is to Blanchard grind the parting line to establish locating surfaces.

Then, a No. 18 Blanchard Surface Grinder (shown above), with 36" magnetic chuck, rough grinds the end faces of all five sets in 17 minutes—at an abrasive cost of only 2¢ per piece! This operation provides locating surfaces for additional machining. By using the correct Blanchard wheel* and proper rate of down feed, the wheel dresses itself and removes three cubic inches of cast steel per minute.

The final Blanchard operations include finish grinding both end faces—removing .015" of stock from each end, flat and parallel to ±.001". Each surface is ground in 17 seconds, fourteen pieces to a load, located directly on the magnetic chuck.

**Blanchard Grinders perform best with Blanchard Wheels!*

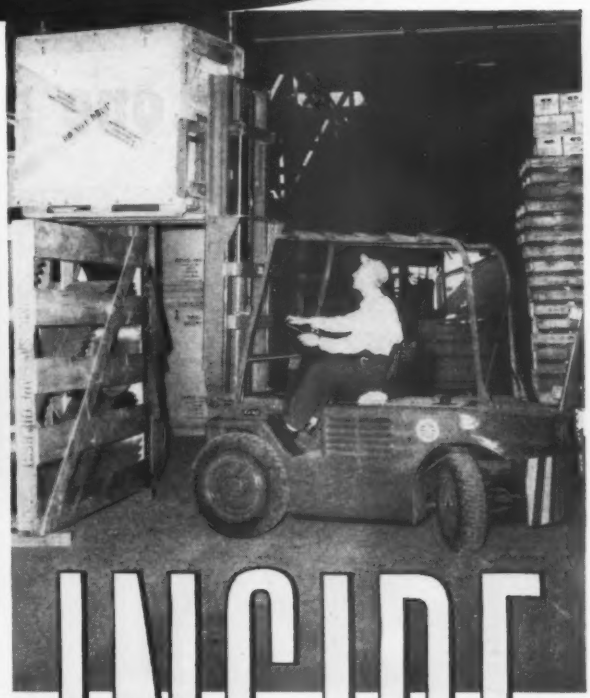
Send for your free copies of "Work Done on the Blanchard", fourth edition, and "The Art of Blanchard Surface Grinding".

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

EQUAL PERFORMANCE



OUTSIDE AND INSIDE

HYSTER XA-60 (6000 LB) AND ZA-80 (8000 LB) LIFT TRUCKS CAN TAKE ROUGHEST GOING OUTSIDE...MANEUVER IN TIGHT QUARTERS INSIDE

Both of these Hyster lift trucks give you the *most truck* in the least space...because they are specifically designed to withstand the hardest kind of outdoor use, and yet provide the easy maneuverability *inside* your plant formerly available only with lift trucks of much smaller capacity. (The Hyster ZA-80 is pictured at left, XA-60 at right above.)

Large pneumatic tires provide extra traction outdoors, give smooth riding indoors—affording extra protection to your floors and building.

Either of these trucks often makes it possible for a plant to operate *one truck instead of two...* offering performance unsurpassed for inside-outside work cycles. Both trucks offer lower maintenance, longer life and lower operating costs than which have long been considered normal for lift trucks of these capacities. Call your Hyster Dealer today for full information, or write for Catalogs 1230-A, 1231-A.

HYSTER

HYSTER COMPANY
753 9th Ave. North
Seattle 9, Wash.
ELliott 2401

HYSTER COMPANY
4445 3rd Street
San Francisco 24, Calif.
Mission 8-0608

HYSTER COMPANY
2425 So. Garfield Ave.
Los Angeles 22, Calif.
RAymond 3-6255

HYSTER SALES COMPANY
2105 S. E. 7th Ave.
Portland 8, Oregon
Filmore 6471

STEEL...one piece or a truckload

Delivered where you want it . . . . when you want it

Sure we like big orders—and we handle them easily, every day, because our stocks are the world's largest, our cutting and handling facilities unsurpassed. But our business depends on small orders as well, and you'll find we never lose sight of this fact. Whether you want one bar or a thousand—one sheet or many tons, you'll get courteous service—quick delivery. Dependable, certified quality, too. Call us and see.

JOSEPH T. RYERSON & SON, INC. **RYERSON STEEL**

Principal products in stock: Bars, structurals, plates, sheets, tubing, alloy steel, stainless, re-bars, etc., also machinery & tools

LOS ANGELES—Plant: 4310 E. Bandini Blvd. Mail: Box 3817, Los Angeles 54. Phones: ANgelus 2-6141, from San Diego, (no toll) ZEnith 6660.
SAN FRANCISCO—Plant: 65th & Hollis Sts., Emeryville. Mail: Box 188, Emeryville, California. Phones: OLympic 3-2933, ENterprise 1-0176.
SEATTLE—Plant: 1200 - 4th Ave. Mail: Box 3268, Seattle 14. Phone: SEneca 2300.
SPOKANE—Plant: North 207 Freya St. Mail: Box 2158, Spokane 10. Phone: KEystone 9311.

"Work smarter, not harder!"

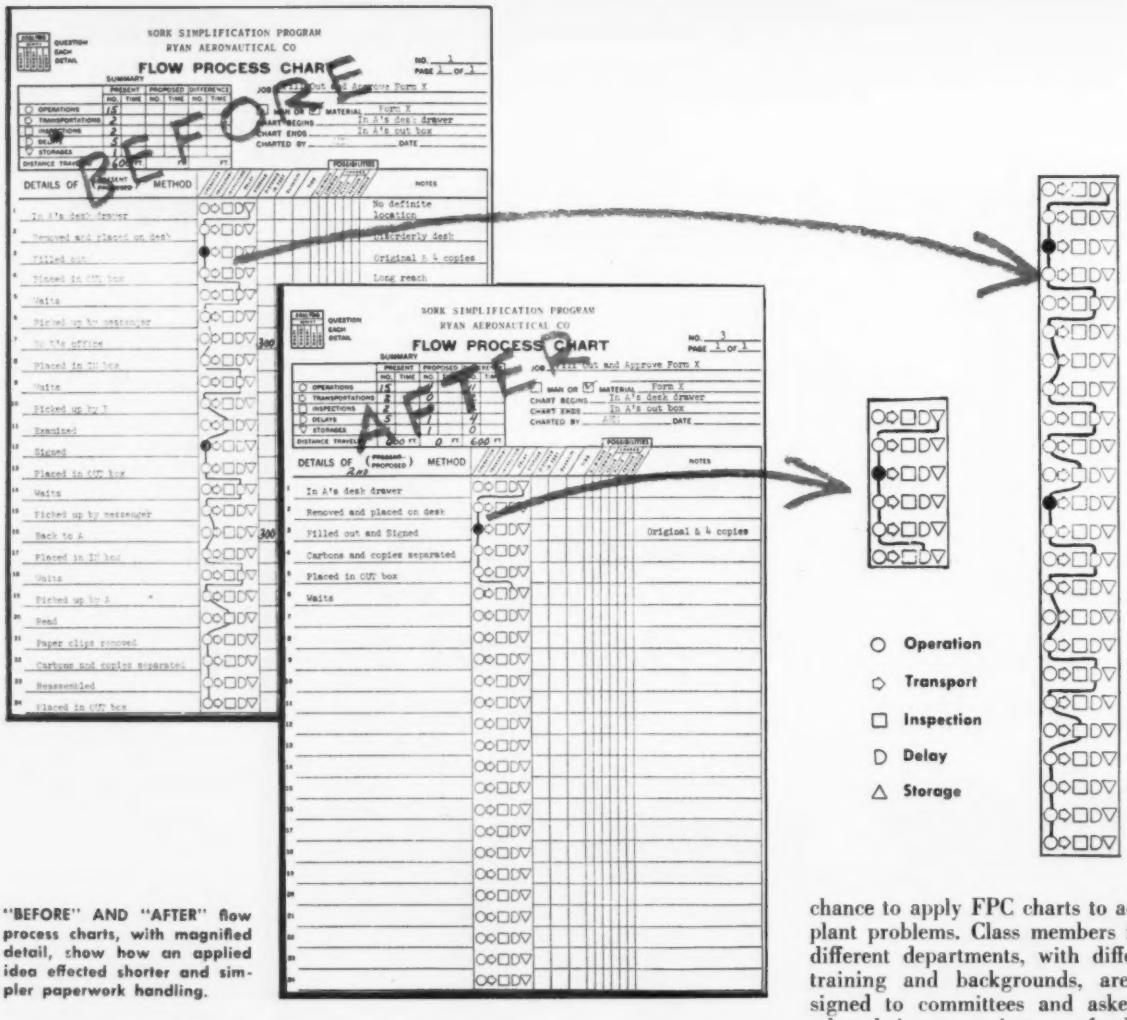
INDUSTRIAL SUPERVISOR Robert Smith explains the flow process chart's many uses.

WHY do I do this task exactly this way?

Isn't there a much simpler, easier way of doing this job, whether it's a tedious bit of filing or a complicated production operation? Chances are good that a long thoughtful look at an awkward job in your plant will reveal possibilities of doing the job another way with fewer headaches for everyone involved in it.

All of us tend to take our work for granted. And in doing so we can easily overlook opportunities to do our jobs easier and better. There are almost always situations around a plant where we could work "smarter, not harder," and be better off. Cleaning up bottlenecks in the job makes any firm run more efficiently, and this efficiency means increased productivity and improved job security, whether the business is a small job shop operation or a complex, high speed production line.

This critical examination of just why a job is done in one particular way is the heart of a work simplification program that has resulted in a total saving of over $75,000 in its first 12 months of operation at Ryan Aeronautical Co., San Diego, Calif. This figure covers only a conservative estimate of dollars and doesn't touch the intangible benefits of the program—process charts, flow diagrams, and tested precepts, for giving substance



"BEFORE" AND "AFTER" flow process charts, with magnified detail, show how an applied idea effected shorter and simpler paperwork handling.

to good ideas which might otherwise be overlooked.

Case example

As a case example of how the system works, consider this job undertaken by a work simplication committee—a situation wherein a single form takes the place of what previously required 10 copies to be typed and 10 envelopes to be distributed.

The committee set up was headed by a chairman from the outside production department and one man each from engineering, production engineering, and dispatching.

In the first two conferences of the course, these men, along with their 16 classmates, learned basic objectives of work simplification: "To get better products with less effort, in less time, with greater safety, at lower costs." Also considered in these sessions were the advantages of keeping an open mind to a new idea, as opposed to the response, "It can't be done."

Flow process chart

At session three, the class was introduced to the flow process chart (FPC). Five different symbols on the FPC, indicating operation, transportation, inspection, delay, and storage, make it possible to record graphically every step of a job under examination.

In filling out an FPC, the student is shown how to break down a job into its three essentials:

1. "Make ready"—the effort and time spent in setting up equipment, machines, and materials in preparation for performing a task.
2. "Do"—the actual performance of the job.
3. "Put away"—the clean-up following performance of the job.

This type of analysis often pays off immediately with the sudden realization that there is no good reason for doing the job in the first place. Thus, all three functions can be eliminated at once.

Conference four gives the class a chance to apply FPC charts to actual plant problems. Class members from different departments, with different training and backgrounds, are assigned to committees and asked to select their own project—preferably a bottleneck that takes too much time, costs too much, or requires too much running around to find materials, tools, and supplies.

Problem analysis

Our sample committee picked an office task that was performed an average of 26 times a week. It was seemingly an essential operation involving the typing and distribution of a "closed short-shipping form," used to notify certain departments that a shipment consigned to Ryan would be closed out with a shortage. For years these forms had been made up as needed, 10 copies at a time, and distributed by a purchasing department clerk.

The committee carefully studied each detail and asked themselves such questions as: Why is the job done? Why is it done in that place? Why at that time? Why by that person and in just that way?

Next they asked for opinions from

everyone concerned— the girl who handled the forms, the department head, and the people who received the forms at the other end of the line.

Then, unexpectedly, they came across a second form, used regularly by all the same people, called the "purchase order notice." From this second form came the solution to the problem. It was decided to eliminate the first form, treat shortages as a "change," and add the information to the list of items already being routed to interested departments.

Another example

One work simplification committee noticed that after the assembled Ryan Firebee drone missile was painted, it was necessary for two men to round up a dolly. load on the Firebee, and haul it a distance of 4,906 ft. to the infra-red drying lights. They suggested that the light be permanently moved to the Firebee building instead, a thought that many people had vaguely wondered at. but had never acted upon. The drying lights were moved to the Firebee building with a resulting production man-hour saving of more than $1,300.

Another group worked out a method of using a template for trimming and burring fuselage skin. The old way of doing the job took two men an hour and a half to clamp the skin in place over a fixture, scribe the cutting lines, and then shear by hand. Using a template designed by three members of the group, the job can now be done with a hand routing machine more accurately and with less waste metal in 15 minutes.

Organization

The work simplification program is kept going by three conference leaders, Bob Smith, Dave McLees, training department coordinator, and Lee Kann, industrial engineer. In conducting the 112 conferences held so far, these three men have developed and perfected their methods. Three approaches which provided the best results are: "Tell them," "Sell them," and "Consult them."

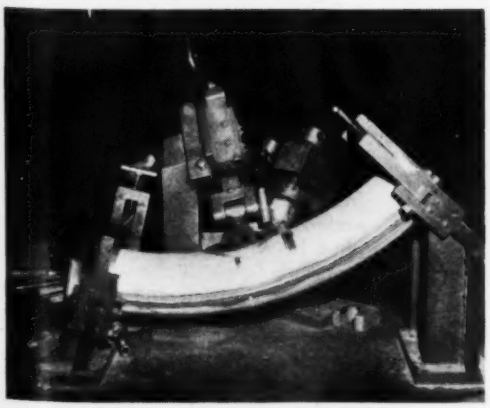
Most good supervisors use all three methods. They have found that a great deal can be taught through explicit, thought-provoking situations which can be dramatized in class. For instance: two members of a class are selected to play the parts of supervisor and a tool crib leadman. The supervisor is trying to get the leadman to install a new system of checking out and storing tools. Before class, each man is given a list of facts to guide him in his characterization. For instance, the leadman is told that all his foremen like him, that he has been doing a good job, that the old system has worked smoothly for years.

The supervisor's fact sheet tells him that the new system he is trying to sell is well worth while and will save the company money. Then the supervisor and leadman explore possible ways of applying the new system to this job. Techniques learned in a class situation such as this can be applied to actual plant problems.

Prizes are awarded to the three committees whose projects have been selected as the most outstanding in their group, and awards are given at the fourth meeting of the following class.

Work simplication conferences were developed by Allan H. Mogensen, whose system is defined as "The organized use of common sense by everyone involved to find easier and better ways of doing work."

TWO IDEAS THAT PAID OFF



THREE clamps used to hold bracket to manifold section (above) were difficult to weld around and had to be moved, until a work simplification idea provided an overpress template eliminating clamps and leaving edge accessible (below).

A WORK SIMPLIFICATION committee decided to replace four small weights, jig, and platform (needed to simulate weight of fuselage tail section) with a single weight and platform. This new method eliminates four hoisting operations.

Corrosion causes and cures

Here's an idea of what it is and how to combat it

CORROSION is a direct chemical or electrochemical reaction between metal and its environment. When the environment is water, the reaction is almost always electrochemical. The degree of protection afforded by a rust coating in neutral water accounts for the wide variation in corrosiveness found. Rust coatings formed in alkaline solutions are more protective than those in neutral solutions, and the corrosion rate decreases as the protective film is formed, but the initial rate of corrosion (which builds up the protective film) is about as great as that in neutral waters. In acid waters a protective film provides only slight protection.

Galvanic corrosion

When two dissimilar metals such as cast iron and bronze contact or are otherwise electrically connected to each other in a corrosive liquid or electrolyte, a galvanic cell is formed and a current flows from one to the other.

This form of corrosion is usually localized near the point of contact, and may appear as deep grooves or pits. The attack will tend to concentrate on the less resistant metal.

Metals having similar resistance to corrosion do not have a strong tendency to produce galvanic corrosion, and are relatively safe to use in contact with each other. The farther apart the metals stand, the greater will be the galvanic tendency.

When design or economics requires that dissimilar metals be coupled, galvanic corrosion can be minimized by: using insulated spacer joints; avoiding designs that require coupling small areas of anodic metal with large areas of cathodic metal; and use of cathodic protection.

Uniform corrosion

Uniform corrosion is a uniform attack on the metal and is generally solved by selecting a material more resistant to the corroding solutions, the use of inhibitors, protective coatings, or combinations of each.

Erosion corrosion

Most metals depend upon the formation of a protective surface film against further chemical attack. It is understandable, therefore, that an increase in velocity or abrasives in the pumped fluid could remove the protective film and result in an accelerated attack.

Intergranular corrosion

Intergranular corrosion is primarily confined to the austenitic, non-magnetic chrome-nickel stainless group and is evidenced by attack in the grain boundaries. The cause is precipitation of chromium-carbides to the grain boundaries and results in practically complete destruction of the mechanical properties of the metal for the depth of attack.

Pitting corrosion

Pitting corrosion takes the form of localized attack in which rapid penetration may take place at several small areas of random location. In general, pitting is most likely to occur when chlorides or other halogens are present in an oxidizing solution.

Other factors which must be considered are temperature, aeration, quality and quantity of dissolved gases, and numerous others. Aeration of most solutions is normally desirable against any of the stainless steels but can be detrimental with copper or copper base alloys.

Protective coatings

Protective coatings on standard base materials are able to handle many corrosive situations as well as or better than many more expensive and hard-to-handle base metal alloys. Many circumstances that once required stainless steels, monel, and other materials can now be handled with neoprene, or a plastic coating over standard cast iron or bronze.

Asphalt dips and base for protective paints are still used, but to a much more limited degree than in the past. Application is by brush, dip, spray, or spinning.

Plastics offer a great variety of coatings that will handle almost any conceivable corrosive agent. Most of these are applied by spraying in successive layers and can be used to coat irregular surfaces successfully.

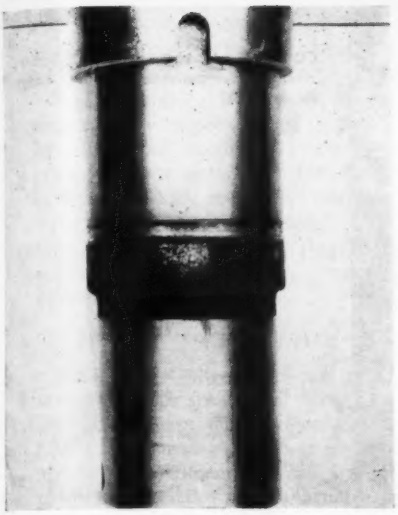
Rubber coatings (both natural and synthetic) can be applied by cementing and/or vulcanizing sheets to the surface to be protected. Neoprene, applied by successive sprayings to the proper thickness, is almost unbeatable for both corrosion and abrasion resistance.

Glass lining methods are being developed that may offer more extensive protection for column pipe and heads.

Changing conditions

A vertical turbine pump installation handling San Diego harbor water gave excellent service for several years and finally failed through excessive corrosion. Because of the excellent service record, the units were rebuilt using the same materials. The rebuilt units lasted only a few months. Investigation showed that the corrosion occurred because of the high amount of oxygen present in the water. During the period of good service, the water had contained high concentrations of organic matter and the oxygen in the water was dissipated in digesting this organic matter. Recently, however, a sewage disposal plant was put into service and this eliminated the organic matter, leaving the oxygen free to generate the corrosive attack on the pumps.

This article is based on a panel discussion before the Vertical Turbine Pump Assoc. Panel: B. Samelson, The Deming Co., Salem, Ohio; W. L. Dornaus, Byron Jackson Co., Los Angeles; P. H. Brown, Johnston Pump Co., Pasadena, Calif., T. R. Mackay, Fairbanks-Morse & Co., Pomona, Calif.; F. E. Dunn, Worthington Corp., Succasunna, N. J.



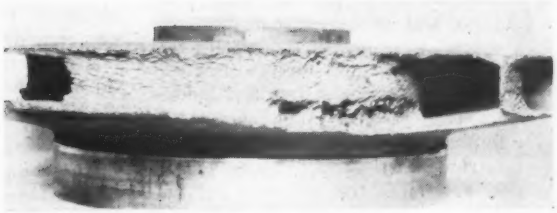
UNIFORM chemical attack on a 410 stainless steel shaft sleeve in a crude oil pipeline. Chemical attack was due to an acid reaction between the petroleum product and moisture.

FERRIC chloride got into the system, causing the failure of this part made of Hastelloy B and operated in hydrochloric acid.

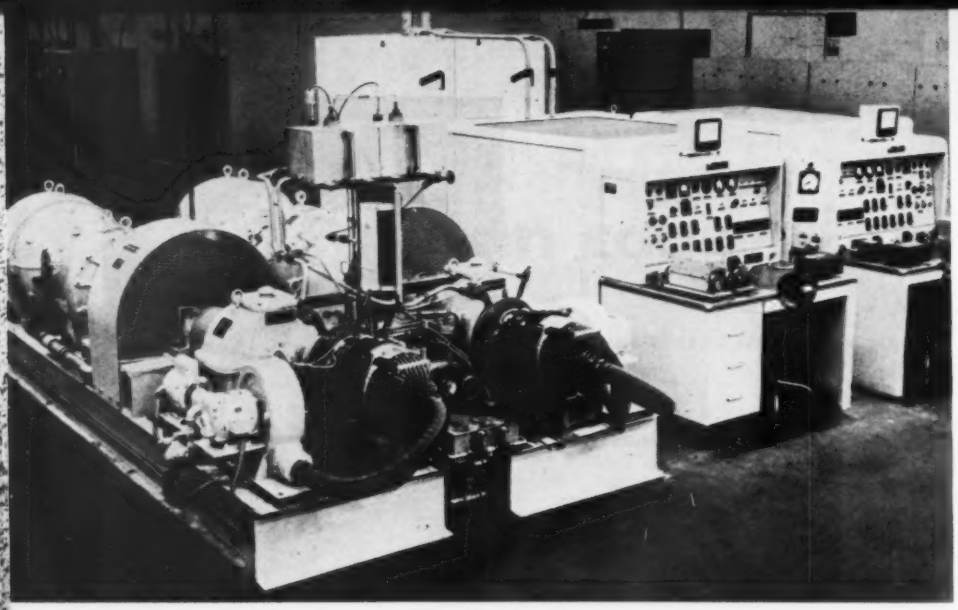
WATER containing a fair amount of sulfates and chlorides caused slight graphitization of iron; and the pump velocity was sufficient to erode away the reaction end product, resulting in further corrosion.

DARK LINES in the photomicrograph of the structure of a stage piece are grain boundaries, which in properly heat-treated material would show a thin clearly defined line.

THIS photomicrograph shows normal gray iron structure, which is not too desirable, having an excessive amount of soft ferrite which tends to erode or graphitize.



THIS BRONZE impeller was in neutral water service but failed because of cavitation near the leading edges of the impeller vanes.



COMPLETE test stand with all aircraft electrical components in place ready for testing.

Testing made accurate by flight simulators

Electrical systems for high-speed aircraft get realistic trials on new test stand

By
HARVEY R. JUDD
Application Engineer
American Electronics Inc.
El Monte, Calif.

AMERICAN Electronics Inc. develops and manufactures special purpose rotating electrical equipment for aircraft and other industries. The Electric Machinery and Equipment Division, known as American Electric Motors, Inc., El Monte, Calif., designs and manufactures aircraft and industrial motors, aircraft test equipment, and high frequency generating equipment.

WITH the ever increasing complexity and higher capacity ratings of the electrical systems of large military aircraft, the time came when existing test and evaluation methods and equipment were wholly inadequate.

Douglas Aircraft Co., designers of the B-66 high-performance medium jet bombers, were one of the first to realize this and took steps to procure adequate electrical system test facilities. The Electric Machinery and Equipment Division of American Electronics Inc. was called upon to design and build the necessary equipment.

What was required was a laboratory test facility for operation and testing of all components of the complete aircraft electrical system under simulated flight conditions. This test stand was to incorporate all of the principal components of the parallel 60-kva. aircraft electrical system, including the hydraulic constant speed drive transmissions. The prime movers for the alternators on the aircraft are the main drive jet engines.

It was felt by both the aircraft company engineers and the American Electronics engineers that in order to completely check each component of the system, it would be desirable, and often necessary, to operate the complete system, including the constant speed drives, at full flight operation speeds and electrical loads, including overloads. The two drive units, the load banks, the instrumentation, the electrical protection, the switching, etc., should, as closely as possible, simulate actual operating conditions in the airborne aircraft.

Components

The completed test stand, which is now installed and in daily use, consists of the following principal components.

1. Two electric motor driven, variable speed drive units, driving the constant speed transmissions and the alternators through a speed range of zero to 9,000 rpm. at electrical loads up to 120 kva. each. These N-86 Lufkin high speed increasers have a ratio of 2.75 to 1 and transmit 109 hp. at any speed beteen 1,090 and 3,270 rpm. input and up to 9,000 rpm. output. Gears are designed to transmit 163 hp. for 5 minutes at 9,000 rpm.; 218 hp. for 5 seconds at 9,000 rpm. The N-86 Lufkin gears are driven by induction electric motor through Dynamatic clutch.

2. Control consoles, including complete instrumentation, variable speed

control, motor controls, load bank switches, special test switches and controls, pilot lights, etc.

3. Two electrical load banks, of sufficient size to completely load to capacity (including overloads) both aircraft alternators with power factor and load increments infinitely variable throughout the required range.

4. Motor control and variable speed control equipment cubicles as required.

Simulated conditions

Airborne jet alternators are tested at simulated air speeds and flying conditions, and are mounted on AND-20006 Bell housings which are bolted to the gear housing. The driving power required for each alternator is approximately 85 hp. The airborne alternator must operate throughout the jet engine speed range of 3,000 to 9,000 rpm. The test stand drive unit therefore must develop as its output shaft the required 85 hp. continuous plus the constant speed drive transmission losses, throughout the speed range of 3,000 to 9,000 rpm.

This required speed adjustment is obtained by the use of Dynamatic eddy current couplings, driven by standard squirrel cage induction motors and connected to the aircraft constant speed drive through an industrial type speed increasing gear.

With this drive system the constant horsepower variable speed requirement is met with equipment requiring a minimum of space and requiring only very simple controls. The drive unit output speed is held constant at steady state loads within plus or minus ¼ of 1%. Speed transients under maximum shock loading are held to less than 3%.

Acceleration rates

Another requirement of the drive unit is to simulate the acceleration and deceleration rates of the jet engine which drives the airborne alternator and constant speed drive units. This is accomplished very simply with the eddy current coupling by using electronic circuits to apply coupling excitation at a predetermined and adjustable rate. Deceleration control is accomplished by similar means, applying controlled excitation to a separate, fixed winding providing a very effective eddy current brake.

In addition to providing the variable speed power required, the drive units incorporate the complex hydraulic system and instrumentation required to operate and test the hydraulic constant speed drive transmission.

The airborne transmission receives its hydraulic oil through the jet engine accessory mounting pad. In the laboratory facility, therefore, the complete hydraulic system must be simulated, requiring hydraulic pumps, oil filters, oil reservoirs, and an automatically controlled oil cooling system. Instrumentation is provided to indicate oil in and out temperatures, oil in and out pressures, and rate of flow.

The control consoles contain the various airborne components such as circuit breakers, current transformers, protective devices, etc., and must accommodate by plug-in arrangement the alternator control panel, the alternator voltage regulator, the constant speed drive load and frequency controller, and the automatic paralleling device.

Additional circuitry and switching is included to simulate abnormal flight conditions such as ground faults, open circuits, overvoltage, and under-speed.

Switches and controls

Switches and controls are provided to control completely the power factor and magnitude of the simulated load from the load banks, which accurately loads the alternators under simulated flight conditions. Electrical instruments and pilot lights are provided to show continuously, at a glance, the electrical status of all components. Special tachometer indicators are included to accurately show the input speed to the constant speed drive.

The drive unit controls are included on the control panel and they include several hand-automatic switches to allow the testing of individual drive components. Under normal automatic conditions complete electrical and mechanical interlocking is provided to allow the safe operation of the complex drive units by the mere pushing of a start button.

Load banks consist of specially designed industrial type resistors and reactors. Both resistors and reactors are carefully calibrated to insure accurate load values. The designs are such that very accurate power factors may be obtained and waveform distortion is virtually unmeasurable.

Each resistor and reactor bank contains a vernier adjustment, which, together with carefully selected load steps, allows infinite adjustment of both power factor and load values. The smaller increments of load are switched directly by heavy duty, deck type switches, and the larger increments of load are handled by industrial type magnetic contactors.

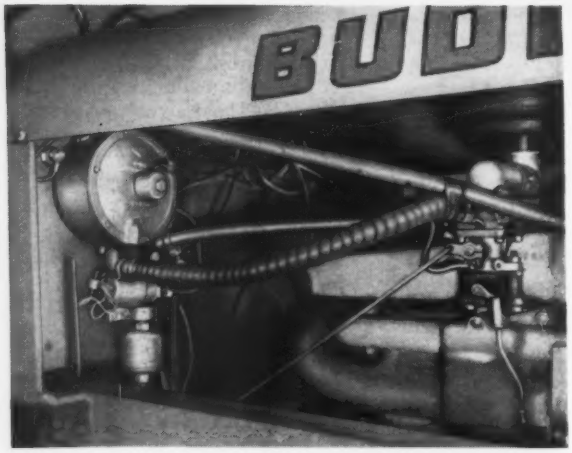
Used daily

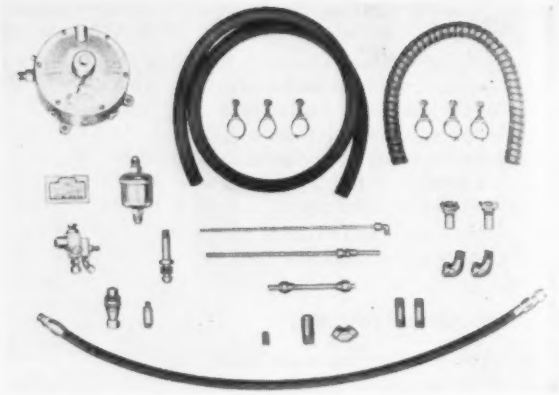
Since the installation of the first American Electronic dual alternator test stand, it has been in daily use, both for the routine testing of components and for complete system analysis and trouble-shooting. Many system problems have been solved with this facility and many component improvements have been possible due to test data obtained from this equipment.

A second test facility has been completed and shipped to another aircraft company. This second unit is capable of making complete simulated flight condition tests on the components from two different aircraft. Additional components and switches are provided so that the control board may be set up very quickly to handle either aircraft system.

This multiple use feature may be expanded to almost any number of aircraft. Aircraft and component manufacturers and military aircraft overhaul bases may therefore make one installation of the basic load control and drive equipment and add control sections to accommodate the testing of any number of electrical systems.

CONTROL panel with electrical components plugged in for a test.





COMPONENTS (above) of a typical kit required for LP-gas conversion. Conversion kit has been installed close to carburetor in engine (left).

Propane power proves cheaper

Lift truck costs from Douglas bear out earlier results reported by Lockheed

PROPANE'S economy as fuel for lift trucks and other internal transportation was reported in the August 1954 issue of WESTERN INDUSTRY in a report of Lockheed Aircraft's experience. Now comes ample corroboration from Douglas Aircraft Co.

Douglas found, in an exhaustive test, a saving of $0.061 per engine hour on industrial tugs and $0.085 on fork lift trucks. Major overhauls came only half as often, and the engine life was doubled. They feel that the tests furnished conclusive proofs that the conversion of 103 units of various types and sizes now going on will pay for itself within a two-year period from savings resulting from the change.

Equipment selected for the test consisted of four Clark industrial tugs and two Yale fork lift trucks. Half of the units were to be converted for and operated on propane, and the remainder to operate on gasoline. An attempt was made to use units with either recently overhauled engines or recently installed new engines. In addition, all units were supplied with new sets of spark plugs, fresh oil, and new oil filters.

American Liquid Gas Corp., Los Angeles, supplied the LP-gas, a dispensing unit, and also converted the engines on the test units. They were also required by Douglas to furnish absolute proof that the installation as well as the equipment would meet all existing safety codes of state, county, and city and the requirements of the Board of Fire Underwriters.

Both the spud-in and LP-gas carburetor systems were installed, depending on the equipment. With spud-in conversions, the existing gasoline carburetor is used, while in the other type it is replaced by an LP-gas carburetor.

Laboratory tested

Collected data covered:

1. Fuel consumed.
2. Oil and filter change.
3. Oil consumed (added).
4. Fuel and combustion system maintenance repairs.
5. Amount of actual engine operation.

Engine hour meters provided an accurate basis for measuring the actual amount of engine operation regardless of whether the unit was moving or not, and readings were taken daily.

Faber Laboratories was engaged to conduct impartial laboratory tests on specimens of crankcase oil for each test unit. Specimens were collected and sent to the lab for approximately every 75 hours of engine operation. The report was to indicate the following:

1. Dilution of oil by the fuel.
2. Volume of solids and amount of sludging.
3. Contamination by foreign matter.
4. Efficiency of engine operation.
5. Viscosity of the oil.
6. Laboratory recommendations regarding oil and filter changes, fuel system maintenance, and combustion system maintenance.

The test began October 10, 1953, and a cut-off date was set at March 13, 1954, for the purpose of an early evaluation of results. As of May 7, 1954, the test was still being continued, and at this date only one of the three propane operated units had required any oil change, and this was due to a timing problem. The test

Summary of test results

Industrial tugs

	Propane	Gasoline
1. Gallons of fuel per engine hour	0.471	0.485
2. Fuel cost per engine hour	$0.033	$0.086
3. Fuel and combustion system maintenance cost per engine hour	$0.007	$0.015
4. Total cost per engine hour	$0.040	$0.101
5. Saving per engine hour	$0.061	...

Fork lift trucks

1. Gallons of fuel per engine hour	1.046	0.776
2. Fuel cost per engine hour	$0.073	$0.138
3. Fuel and combustion system maintenance cost per engine hour	$0.010	$0.030
4. Total cost per engine hour	$0.083	$0.168
5. Saving per engine hour	$0.085	...

was continued to determine how long the original oil could be used in the other two propane operated units.

As of January 13, 1955, one Clark fork lift truck had operated 2,693 engine hours without an oil change, and as of January 27, 1955, one propane operated tug had operated 3,031 engine hours without an oil change.

During 1954, new points were installed only four times and no new spark plugs had been installed on either of the units. On another tug, which had 1,415 engine hours at the time it was selected for the test, new spark plugs were installed at the beginning of the test and, as of January 1, 1955, it had operated 4,300 engine hours without changing plugs. It has been estimated that one engine hour of operation is equal to from 30 to 40 miles of road travel.

A comparison of the amount of oil consumed and changed indicated that only 27 quarts were used in the propane units as compared to 103 quarts in the gasoline units.

The report was presented by K. W. Coghill, superintendent of internal and over-the-road transportation equipment, and the tests were conducted under the direct supervision of his assistant, A. N. Kinner.

Savings of $9,560

Projecting the engine hour savings to an annual basis, a saving of $9,560 per year for the 103 units was indicated, based on fuel, fuel system maintenance, and combustion system maintenance cost reductions only.

"Published data," declared Mr. Coghill, "regarding the use of propane instead of gasoline in automotive units indicated twice the time between major overhauls and twice the engine life, or a 50% reduction in corresponding costs.

"Since the internal transportation equipment operates a great deal more with the engine idling than does automotive equipment, the engine of an internal transportation unit is subjected to a greater extent to the resultant bad effects of idling and the correspondingly higher maintenance costs. With propane as a fuel, a greater reduction in overhaul and engine replacement costs than that indicated above could reasonably be expected; however, the same 50% reduction figure was used to calculate the expected savings."

Douglas has installed a 450-ft. pipeline from its LP-gas standby storage tank to the garage service station so that both gasoline and propane can be dispensed by one attendant.

Plywood pallets shave repair bill

Comparison shows reduced loss, maintenance, and weight with plywood

THERE is a lot of carton handling —both full cartons and empties— at Heidelberg Brewing Co., Tacoma, Wash., and that means keeping some 11,200 pallets busy. Replacement and repair costs on ordinary wooden pallets ran high enough for Heidelberg to try pallets made of fir plywood in a recent expansion of their palletized handling system.

Results of a comparison between ordinary wooden pallets and both nailed and nailed and glued plywood pallets show plywood pallets cut handling costs and reduce maintenance. Besides this there is a weight saving of nine pounds per pallet.

Since March 1952 the company has put 5,200 plywood pallets into service to supplement its existing stock of older type wooden pallets.

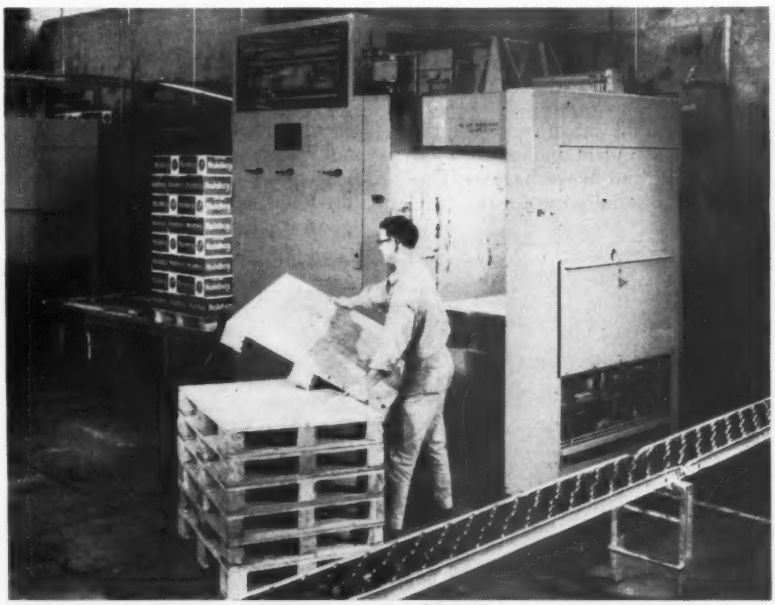
Maximum durability and extra weight capacity are the determinants given by Frank A. Rambo, purchasing agent, for the choice of plywood for the new pallets.

The pallets used by the company consist of a ¾ in. thick fir plywood deck 32 in. wide and 40 in. long. The deck is supported on nine 4x4-in. posts to which are nailed and glued 1-in. lumber skids.

Of the company's 11,200 pallets, 6,000 are of wooden construction, 2,100 are fir plywood deck applied with nails only, and 3,100 are plywood deck applied with both nails and waterproof glue.

In a recent five months repair tabulation by type, the following was learned: 4.8% of the wooden pallets needed repair while only 2% of the nailed plywood pallets and a mere .6% of the nailed-glued plywood pallets needed any attention.

Another striking comparison between the wooden and plywood pallets is their mortality rates. According to Rambo, 53 wooden pallets have been completely lost while only one plywood pallet was destroyed, and this was the result of an accident rather than pallet failure. Repair cost is negligible compared to that of old pallets.



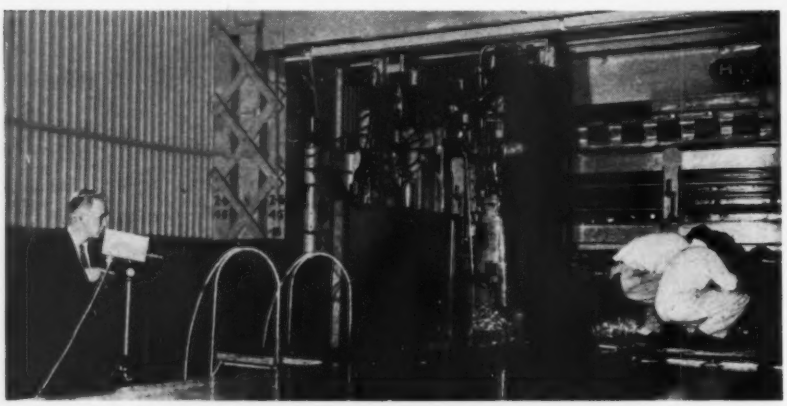
PALLETS of fir plywood, lightweight but strong, have sharply reduced costs and maintenance expense for Heidelberg Brewing Co., in expansion of its handling system.

LEFT: Television camera (in dotted-line circle) scans the gate at Westgate-California Tuna Packing Co. plant to identify trucks. BELOW: A television camera allows remote observation of employees entering a security area.

What the West is doing with

Industrial television

TELEVISION as an industrial tool is fast making its way into Western plants to handle a surprising variety of jobs. Industrial T-V has already been found useful by Southern Pacific Co. They use it to simplify dispatching in their Los Angeles railroad yards. Pacific Gas and Electric Co. has several cameras to keep an eye on steam plant boilers at Pittsburg Calif., and Weyerhaeuser Timber Co. has found a use for the "tireless eye" in one of their northern lumber mills. Industrial television offers opportunities to any plant that can use continuous, fool-proof scrutiny of operations in remote, dangerous, or otherwise undesirable locations. Installations illustrated on this page are of equipment in use at Douglas Aircraft Co., El Segundo, Calif., and Westgate-California Tuna Packing Co., San Diego. Equipment is produced by Kay Labs, San Diego.



AT LEFT, a plant tour is conducted with portable closed circuit television cameras at Douglas Aircraft. ABOVE: A camera operator relays pictures of plant operations to a central auditorium.

By C. N. MAXFIELD
Pacific Coast Manager
Yarnall-Waring Co.
San Francisco

Successful steam trapping depends on care in selection, sizing, installation, and maintenance. First half of this two-part article discusses . . .

How to pick steam traps

STEAM TRAPS, like mothers-in-law, are often blamed for troubles over which they have no control. The formula for successful trapping is rather simple:

1. Choose the proper type of trap.
2. Size it correctly.
3. Install it intelligently.
4. Maintain it adequately.

Lifting steam traps from the class of being a "necessary evil" in a plant is as simple as all this!

Consider a moment, why use a steam trap? In steam heated equipment, when steam gives up its latent heat and reverts to water, about 75% of the available heat has been given up to the equipment heated.

It is desirable to return this water, or condensate, to the boiler so more steam may be made. Quickly getting rid of the condensed steam avoids having it blanket the heat transfer surfaces; a layer of condensate will slow down the flow of heat as effectively as though the layer were insulating board instead of water.

A secondary function of a good trap is its ability to handle air and other non-condensable gases which are a by-product of the steam-to-condensate cycle. Such gases insulate heat transfer surfaces even better than condensate, and about as well as ground cork. To get equipment hotter sooner, steam traps must remove *all* the air *quickly*, and the condensate *as soon as it forms*. Efficient traps, capable of this function, will provide improved production and a better quality product at reduced operating costs.

What type of trap?

Much has been written of the many makes and types of traps manufactured today. To simplify your choice, remember all traps fall into two broad classifications: (1) lift traps (or return-to-boiler traps), which discharge condensate against a pressure equal to, or greater than, the inlet pressure to the trap, and (2) non-return traps. Lift traps are frequently complex and expensive. Their applications are very few compared to the much more widely used non-return traps, which discharge condensate to a pressure lower than the original inlet pressure.

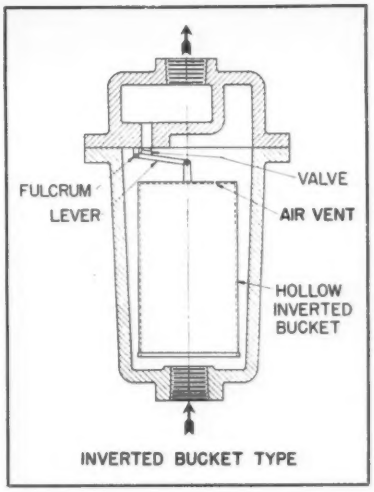
Non-return traps may be subdivided into three groups:

1. Float or bucket.
2. Thermostatic.
3. Thermodynamic.

Float or bucket traps

These traps are manufactured in many varieties and shapes. Basically, the operating principle of all traps in this group is the same, in that a float or bucket opens the outlet valve when the reservoir fills with water. They handle condensate at high temperatures, but handle air poorly. The inverted bucket trap, by means of a small hole in the top of the bucket, handles a limited amount of air, but for adequate air capacity these traps must be equipped with an auxiliary air venting device.

If these traps are to be installed outdoors in freezing temperatures, special precautions must be taken, else breakage of the body may take place.



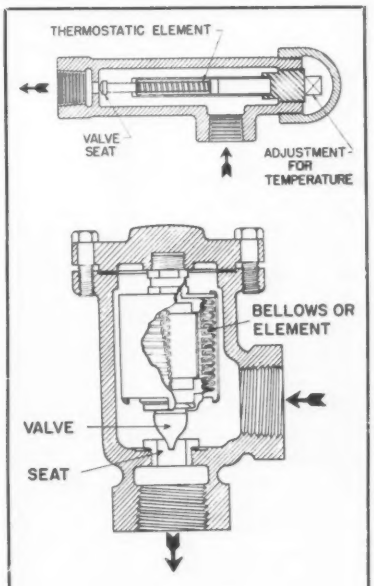
INVERTED BUCKET TYPE

Thermostatic type

Thermostatic traps usually consist of flexible bellows capable of expanding and contracting with heat to open and close the valve. There are other forms of heat sensitive elements, such as expansion tubes, bimetallic strips, etc., which expand and contract, but whatever form the element takes, the principle of operation is the same.

Because condensate at the moment it forms is at the same temperature as steam, this type of trap must wait until condensate cools before it can open again. The thermostatic element must work at some temperature lower than that of the steam, or else it will remain on live steam.

Valve action of this type of trap is relatively slow, since the thermostatic element requires a definite time interval to react to a temperature change. Thermostatic traps usually have high condensate capacity on cold start-up, but capacity is greatly reduced when operating near steam temperature. Air



THERMOSTATIC TYPE

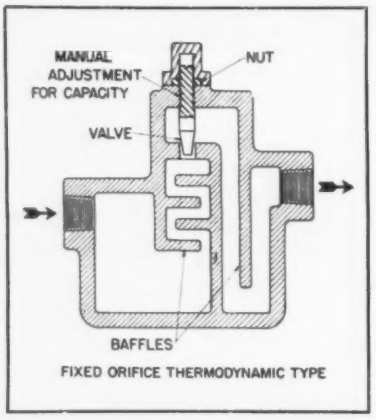
handling capacity is good. Thermostatic traps are not ordinarily recommended for use on superheated steam service.

Thermodynamic traps

Thermodynamic traps include fewer variations than the other groups and are the newest of the traps manufactured today. The oldest in this group, a fixed orifice type, was invented on the Pacific Coast in San Francisco by a steam engineer named Chevalier some years ago. This style is equipped with a labyrinth passage and baffle to aid in reducing steam blow. Adjustment of fixed orifice is made manually.

The most widely used type, the impulse trap, was perfected in 1935 and is now manufactured in several styles for all pressures and temperatures. The impulse trap operates on a thermodynamic principle which causes the valve to open wide on condensate—which it discharges right up to steam temperature—and to close on steam. This provides quick initial heating, even temperatures in apparatus, and very sensitive control of condensate flow.

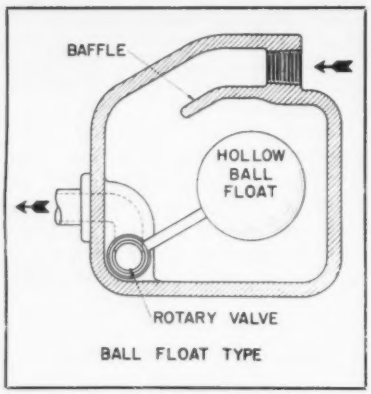
This type has excellent air handling ability, and another important advantage in that it is non-freezing, and no special precautions need be taken at time of installation.



FIXED ORIFICE THERMODYNAMIC TYPE

Careful choice

Choose the proper type of trap to meet your operating conditions. If yours is a batch process, you will want a trap which can handle a lot of air—quickly, in order to bring each batch to temperature as rapidly as possible. Once at holding temperature, your trap should be able to handle a minimum load efficiently and with maximum speed. If the process is of the continuous type, air handling ability becomes secondary, though it is convenient to have for emergencies.



BALL FLOAT TYPE

Consideration should be given to the possibility of standardizing on the product of a single manufacturer. An important guide in this respect should be the preferences of your maintenance men. After all, whatever your choice, they have to make it operate! Good local availability of traps, as well as parts, should affect your choice.

Size it adequately

Like so many things, sizing a trap correctly is a cinch—when you know how. Many a thumb has shown calluses in applying "rule of thumb" methods. One of the most deceiving of these methods is making the trap the same size as the condensate outlet on the jacket or coil. Just as reducing valves in many plants are too large, so traps may be chosen either too large or too small. Try to choose a trap that is neither oversize nor undersize. Oversizing may cause sluggish operation or steam loss, and undersizing will contribute to inefficient condensate drainage and loss of production.

Most trap manufacturers provide capacity tables from which a satisfactory trap selection may be made after the condensate load is calculated. One of the easiest and simplest to use is that provided for the impulse trap, which requires no condensate load calculations. In this bulletin the trap size may be picked directly from the table, once the equipment size and steam pressure is known.

In your choice of trap size, you must also consider choosing a trap which has a pressure rating greater than your line steam pressure. Some types of traps are manufactured to cover every steam pressure in the average plant, for example 0-400 psi., while others require several models and orifices in different pressure ratings to cover such a range.

In any case, if you are choosing a float or bucket trap, be sure you get the right size orifice, for in these traps the orifice must be changed for different pressures. As an example, six different

FOR COPPER AND BRASS MILL PRODUCTS SEE THESE
REVERE DISTRIBUTORS
ON THE PACIFIC COAST

AMERICAN STEEL WAREHOUSE CO.
425 N. E. Ninth Avenue, Portland 14, Oregon
Phone: EAst 9111

AMERICAN STEEL & SUPPLY CO.
44 & 51 E. 7th St., Eugene, Oregon
Phone: 4-6291; 5-4126

EAGLE METALS COMPANY
4755 First Ave. South, Seattle 4, Washington
Phone: LAnder 9974

Helena at Broadway, Spokane 24, Washington
Phone: KEystone 0586

2336 North Randolph, Portland 12, Oregon
Phone: TUxedo 5201

PACIFIC METALS CO., LTD.
1400 So. Alameda St., Los Angeles 21, Calif.
Phone: PR 0171

3100—19th Street, San Francisco 10, Calif.
Phone: MIssion 7-1104

261 W. 5th South St., Salt Lake City 4, Utah
Phone: 22-3461

19 No. 4th Street, Phoenix, Arizona
Phone: ALpine 4-0369

1533 India Street, San Diego, Calif.
Phone: FRanklin 9-5826

TAY-HOLBROOK, INC.
603 Brown St., Box 3038
Bakersfield, Calif.
Phone: Fairview 5-1221

940 Broadway, Eureka, Calif.
Phone: HI 2-4516

920 "M" Street, Box 1866
Fresno 18, Calif.
Phone: 6-8231

222 Ninth Street, Oakland 7, Calif.
Phone: TE 2-4200

1801—22nd St., Sacramento 4, Calif.
Phone: HI 6-3841

P. O. Box 969, Salinas, Calif.
Phone: 2-4771

605 Old County Rd., San Carlos, Calif.
Phone LY 3-7631

165—8th Street, San Francisco 1, Calif.
Phone: MA 1-6800

695 Stockton Avenue, San Jose, Calif.
Phone: CY 2-3606

251 Roberts Avenue, Santa Rosa, Calif.
Phone: S.R. 6400

1234 So. Aurora St., Stockton 8, Calif.
Phone Howard 6-9531

UNION HARDWARE & METAL CO.
5555 E. Ferguson Avenue
P. O. Box 3070, Terminal Annex
Los Angeles 54, Calif.
Phone: RAymond 3-2411

REVERE
COPPER AND BRASS INCORPORATED
Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

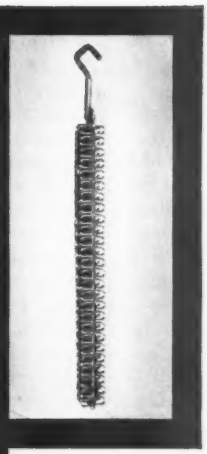
LOS ANGELES: 6500 East Slauson Ave. Raymond 3-3331; SAN FRANCISCO: 116 New Montgomery St. Sutter 1-0282; SEATTLE: 314 Fairview-North. Main 1401

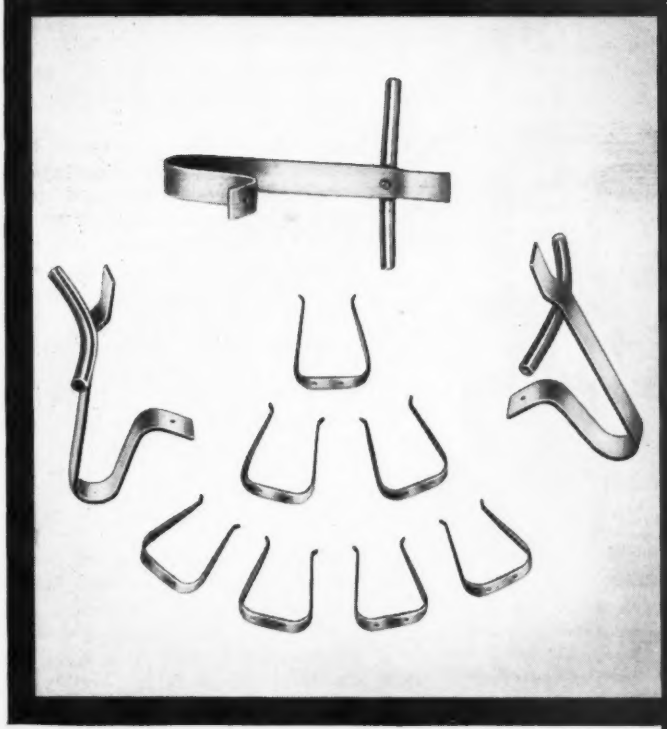
Spring quality of

REVERE

PHOSPHOR BRONZE

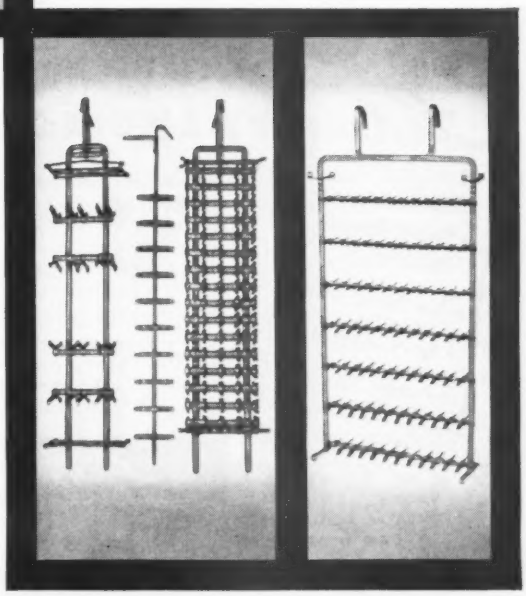
—important to Higgins Rack





When small parts have to be plated, the problem arises as to how to hold them on the plating racks. If they are not heavy enough to hang by their own weight, spring clips must be used. For such clips, the Higgins Rack Coating Mfg. Co., Hazel Park, Mich., uses spring temper Revere Phosphor Bronze Strip. This material is specified because its spring temper gives it the ability to withstand repeated flexing, so that the clips can be used repeatedly, and that small parts can be snapped in and out of them quickly and without distortion.

The racks to which these clips are attached are made of copper bar; the clips are fastened by riveting and soldering. Everything except the contact points of the clips is coated to prevent deposition of the plating metal and loss of current. Higgins is an important supplier of these special racks to the automotive industry, which uses them to plate both interior and exterior trim. The efficiency and economy of this method helps make handsomer cars and trucks as well as numerous other attractive consumer commodities.



Clips and racks made to special designs by the Higgins Rack Coating Mfg. Co., which buys Revere Phosphor Bronze Strip for the clips from Copper and Brass Sales, Inc., a Revere Distributor in Detroit, Mich.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y. Sales Offices in Principal Cities. Distributors Everywhere.

•

LOS ANGELES: 6500 East Slauson Ave. RAymond 3-3331; SAN FRANCISCO: 116 New Montgomery St. SUTTER 1-0282; SEATTLE: 314 Fairview-North. MAin 1401.

sized orifices are required to go from 0-250 psi. Such a trap will operate on a pressure lower than the orifice rating, but not at a higher pressure.

Speaking of pressure, in determining the pressure at which your trap will operate, take the pressure at the trap inlet, not the pressure back at the boiler, for you have a pressure drop between boiler and heating equipment or apparatus, and a further drop through the apparatus before condensate reaches the trap. In addition you may have pressure reducing valves, which further reduce pressure available to operate the trap.

If your trap is of a type which requires you to know the condensate load in order to size it, first compute the amount of steam consumption for the equipment to be trapped. If guess you must, try not to guess too wildly. In any case, the steam load should be figured for the maximum load, generally the start-up. A trap ceases to be an automatic valve if you must run over to help it out with a manually operated by-pass during heavy loads.

Safety load factor

Next, a factor of safety, or safety load factor, must be chosen to take care of cold start-up conditions and consequent high condensate load on starting. From your capacity tables choose the safety load factor applying to your particular equipment. Next, enter capacity table according to instructions given by the manufacturer.

All capacity tables show maximum values and forgetting the safety load factor causes trap to operate wide open much of the time, a bad condition. This factor varies with the process to be trapped, the style of trap, and the type of equipment to be heated. Factors may vary from a low of 2 to a high of 10 or 12.

Thermostatic traps, because of the slower acting valve action, generally require the highest factor, five or six as a minimum. Float traps usually have a lower factor, although one manufacturer recommends a factor of 10 for one type of process. One large refinery organization uses a value of 3 in most calculations, revising this upward as the amount of air to be handled increases.

Thermodynamic traps are perhaps the most modern of all the traps with safety factor requirements, and recommendations vary from 2 to a high of 5 or 6—again depending on the individual application.

Impulse type

If you are using the impulse type of trap, your task is simplified. Merely find the size of the equipment (i.e., a 500-gal. cooking kettle) and steam pressure at trap inlet, then read trap size directly from table for your type of equipment. Safety load factor is already considered in the table. This is an excellent guide to correct sizing, for you need to know only "nameplate data" of your equipment and no slide rules are necessary for proper sizing.

If a trap selector is not available, use the capacity tables in trap catalog, remembering these are for maximum capacity and safety load factor must be applied. In utilizing such a table it is best to check whether tables are for capacity of cold water or hot condensate. Your trap will be operating hot most of the time, and there is a vast difference in the amount a trap will pass depending on condensate temperature.

Installation and maintenance of steam traps will be discussed next month in Part 2 of this article.

Equip your valves for

AUTOMATIC PROCESSING
REMOTE CONTROL
POWER OPERATION

(Above) High Pressure Gate Valve with Ledeen Valve Actuator.
(Left) Ledeen Tandem Type Valve Actuator on Standard Plug Valve.

with
Ledeen VALVE ACTUATORS

★ Simple, Rugged Construction.
★ Few Moving Parts.
★ Easily Installed.
★ Prompt Delivery.

These actuators are for the automatic operation of gate, diaphragm, plug and other line valves, and are pneumatically or hydraulically operated for direct or remote control. Designed as package units, they are mounted directly on the valves without need of special manifolds or outside supports. They are easily, quickly and rigidly installed on new valves or on valves in service.

Ledeen Valve Actuators provide positive operation, permit automatic processing, safety installations, multiple central control ,and require a minimum of maintenance. WRITE FOR BULLETIN 3000.

VALVES • CYLINDERS
VALVE ACTUATORS
AIR HYDRAULIC
PUMPS & BOOSTERS

Ledeen Mfg. Co.
1606 SO. SAN PEDRO ST.
LOS ANGELES 15, CALIFORNIA

Meet U.S. STEEPGRADE

the new Package Belt for steep inclines

No belt was ever better named than the U.S. SteepGrade! Its *new*, exclusive surface design gives positive non-slip control in carrying many materials on descents or ascents as *steep as 45 degrees*. The multiple rows of deep gripper-cleats hold packages and other articles firmly, prevent "avalanches" at critical angles. The ability of U.S. SteepGrade to work at such steep inclines, saves valuable floor space, conveyor length and belt footage. U.S. SteepGrade is the truly modern package belt.

Made by United States Rubber Company from strong, resilient rubber, U.S. SteepGrade's unique deep gripper-cleat design *insures* proper grip and longer wear. Special molding process makes belt and cleats one unit; this exclusive feature prevents gripper-cleats from being torn off by heavy cases. Surface design incorporates self-cleaning action as belt flexes over pulleys—cleans as it flexes!

For more facts about this great new belt, get in touch with any of our 27 "U.S." District Sales Offices or write address below.

"U.S." Research perfects it..."U.S." Production builds it... U.S. Industry depends on it!

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

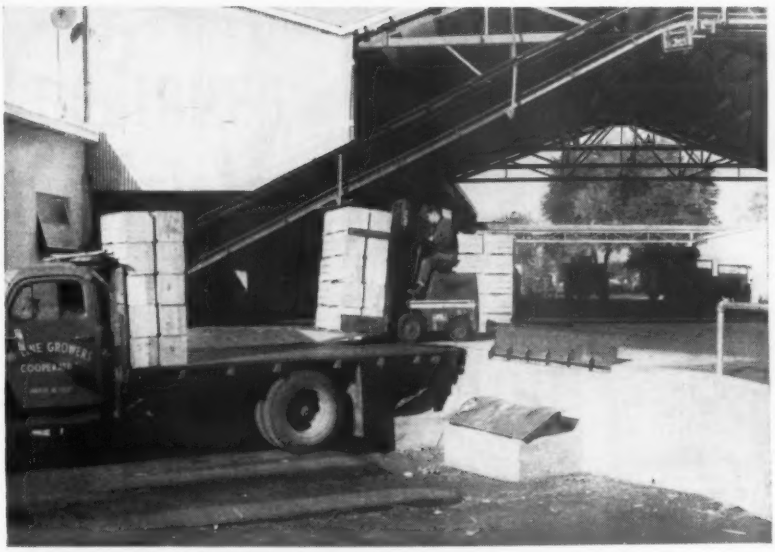
Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

BEFORE REMODELING, the area between buildings No. 1 and No. 2 looked like this.

FIRST, the roof of building No. 2 was raised, increasing capacity by 35,000 boxes.

Revamping plant layout boosts worker output 86%

AREA BETWEEN the two buildings was finally hard surfaced and roofed over to shelter workers and fruit during receiving and handling operations. The overhead conveyor moves packed fruit from packing line to segregating area. Lift trucks shuttle back and forth underneath.



PACKED FRUIT is loaded onto highway trucks by lift trucks. Truck bed is stabilized by backing the truck against an inclined bumper. This raises the bed to floor level and provides a solid base to facilitate loading.

REMODELING an archaic arrangement for processing apples in order to take advantage of economies offered by more advanced materials handling equipment and a more efficient plant layout, has turned Hi-Line Growers of Wenatchee, Wash., into an operation that is as efficient as a plant of the latest design.

Fruit Industries Research Foundation, Yakima, Wash., provided the know-how that led to raising the roof, installing conveyors, purchasing lift trucks, and a general rearrangement of facilities.

The result of this remodeling program is an increase of storage capacity of 43,000 boxes at a cost of only 92c per box. The plant now operates with 5 men less than formerly and each worker handles 86% more fruit than was possible under the old arrangement. And even though last season's apple crop was smaller than usual, the company managed to shave handling costs by 2.1c per box.

Hi-Line handles approximately 200,000 boxes of apples a year in their three storage buildings. No. 1 is a two-story, two-level type structure built to house the packing room and 50,000 boxes of cold storage. Cold rooms were on two different floor levels. The building was built in different sections, having been added onto successively as the need arose.

No. 2 building is a concrete block cold storage plant built a few years before building No. 1. It is about 80 feet away from the original building on a lower level and formerly had 42,000 boxes of cold storage capacity. The building was built to stack fruit 9 and 10 boxes high and thus could not take full advantage of industrial handling equipment.

Building No. 3 is on a railroad siding in Wenatchee, several miles away. It is a one-story building with 20,000 boxes of cold storage. Only packed fruit was stored here.

The main need for additional storage was for handling loose fruit which must be held at the packing plant prior to packing. Additional storage at the packing plant would permit reducing handling costs because both unpacked and packed fruit could be handled with use of industrial equipment.

Industrial handling equipment contributes most to reducing costs when handling loose fruit during receiving and moving to the packing line. Under the old arrangement loose fruit was moved to and from the packing line on hand trucks and belt conveyors. Packed fruit was loaded onto a highway truck and taken to storage by hauling it around to the lower level of building No. 1, where it was unloaded and hand trucked into the basement cold storage or unloaded with the use of a small industrial clamp truck and moved into storage in building No. 2.

The decision

After careful consideration of all objectives and possibilities, it was decided to remodel and add to building No. 1 and integrate its operation with that of building No. 2.

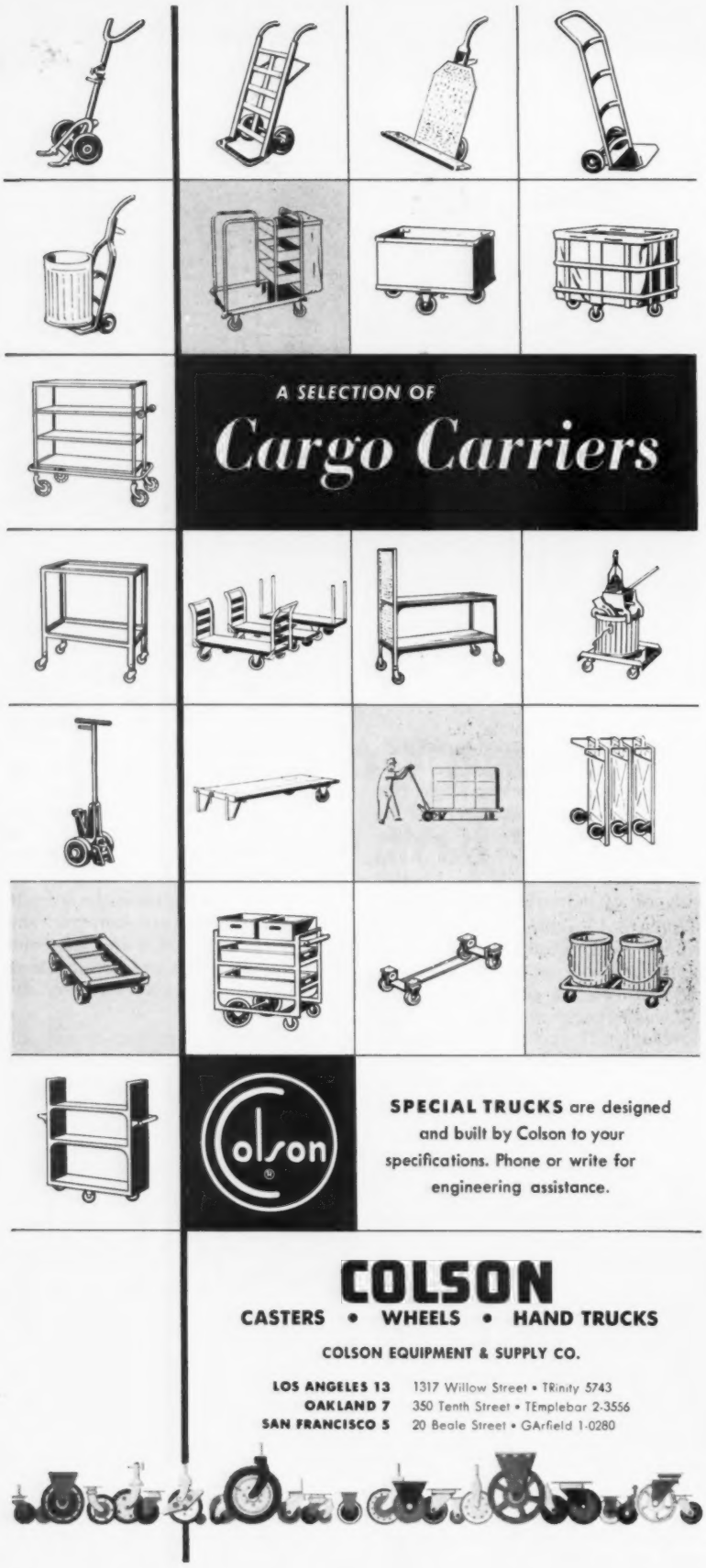
It was also determined that the least expensive way to increase storage capacity would be to raise the roof on building No. 2. This would provide extra cold storage space that was needed and also provide the necessary space for operating lift truck handling. Boxes could then be tiered three units (or 15 boxes) high and a plant layout could be planned which would enable future expansion without impairing efficiency of operation.

Since the remodeling, industrial trucks are used for nearly all this work. Facilities have been rearranged so that there is now a central area between the two buildings in which both loose and packed fruit can be handled efficiently. Now, when fruit goes to the packing line, it is placed on a conveyor by a mechanical destacker and carried to the packing room. In order to save cold storage space, conveyors and stack breaking facilities are placed outside the cold rooms underneath a shed in order to offer protection from the weather.

An elevated conveyor carries the packed fruit to workers in building No. 2 for separation into unit loads of the same size and grade. Then trucks move the unit loads into the downstairs cold storage in the old building, into the enlarged No. 2 building, or onto a road truck for transport to the railroad siding. Almost all fruit (both packed and loose) is now handled by lift trucks.

By keeping in the same vicinity the area for moving loose fruit to the packing line and the area for segregation, a lift truck can move loose fruit from storage to stack breaking area, pick up a unit load of packed fruit, and move it back into cold storage all in one cycle. This transportation method eliminates double handling.

The company's new arrangement will handle any quantity of apples far more efficiently than was ever possible without modern handling equipment.


A SELECTION OF
Cargo Carriers
Colson
SPECIAL TRUCKS are designed and built by Colson to your specifications. Phone or write for engineering assistance.
COLSON
CASTERS • WHEELS • HAND TRUCKS
COLSON EQUIPMENT & SUPPLY CO.
LOS ANGELES 13 1317 Willow Street • TRinity 5743
OAKLAND 7 350 Tenth Street • TEmplebar 2-3556
SAN FRANCISCO 5 20 Beale Street • GArfield 1-0280

Flat belt drives — design tips

By EARL F. DUNN
Administrative Manager
Thermoid Western Corp.
Nephi, Utah

MANY INGENIOUS flat belt drives have been designed by individual engineers for specific applications. Although most flat belt drives involve parallel shafts, it is practicable to contrive drives in which one shaft is placed at almost any angle with respect to the other.

Here are a few tips on designing angular flat belt drives:

1. Belt must be delivered in the plane of the pully toward which it is running.

2. Use pulleys as large in diameter as practical.

3. Keep center distances between pulleys as long as practical.

4. Sufficient space must always be provided between pulleys of an angular drive to permit the belt to turn or change its plane.

5. Be sure that the belt is the proper kind, width, and thickness for the drive. While the use of good belting is recommended for any drive, it is particularly necessary for angular drives.

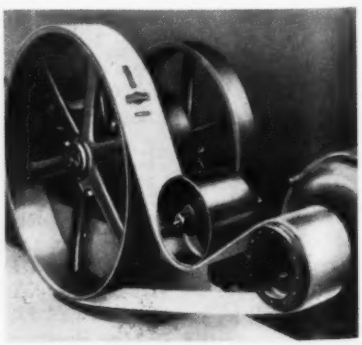
6. Arrange guide pulleys to assure a minimum flexing of the belt.

7. Make sure "mule" pulleys are heavily crowned, in order to properly hold the belt.

8. Do not use flanges or guide plates unless absolutely necessary.

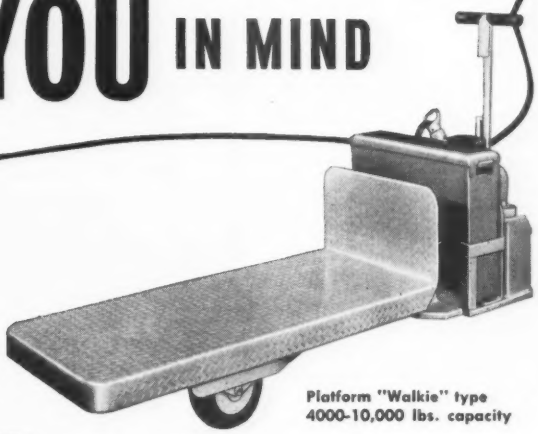
9. Special belts for quarter turn drives are usually made up by: (a) a half turn of the belt, (b) making one edge of the belt longer than the other.

10. By proper design, most angular drives can be made reversible.

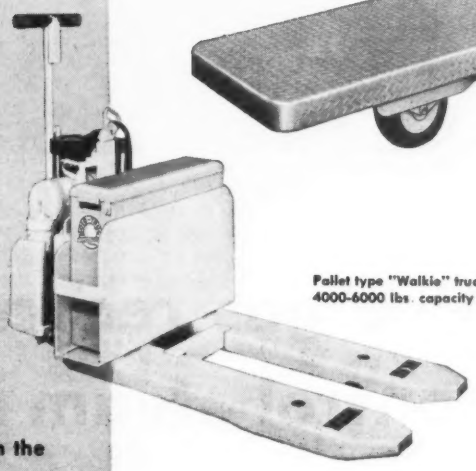


CAREFULLY designed flat belt drives will improve belt life and performance.

DESIGNED & MANUFACTURED WITH YOU IN MIND



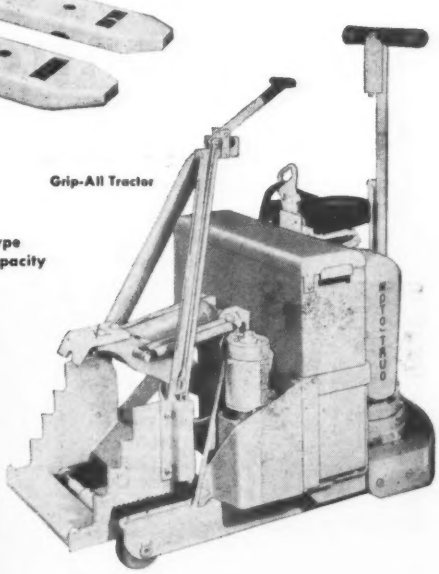
Platform "Walkie" type
4000-10,000 lbs. capacity



Pallet type "Walkie" truck
4000-6000 lbs. capacity

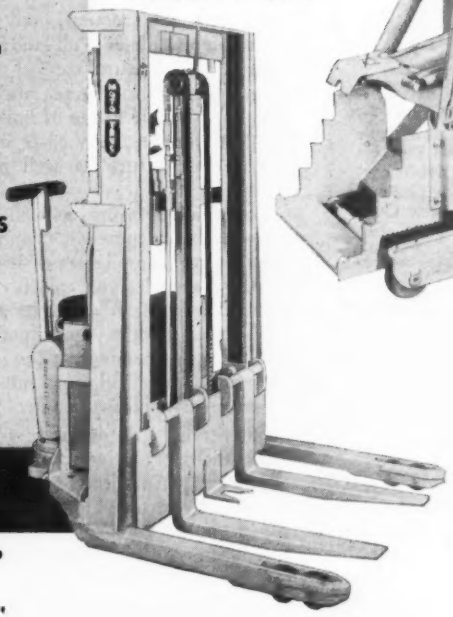
Here's Why...

- **Maximum Maneuverability** . . . some models only 23¾" longer than the load . . . space efficiency plus!
- **Stability** . . . low center of gravity offers maximum stability.
- **Ease of Operation** . . . Patented Roller Grip Controls offer "Simplified Operation".
- **Ease of Maintenance** . . . MOTO-TRUC design offers the finest in quick . . . easy maintenance.
- **Safety** . . . Deadman controls cut off the power and apply the brakes . . . automatically.



Grip-All Tractor

Hi-Lift "Walkie" type
3000-4000 lbs. capacity



REPRESENTATIVES IN PRINCIPAL CITIES

MOTO-TRUC
Designers FOR THE INDUSTRY
PATENTED

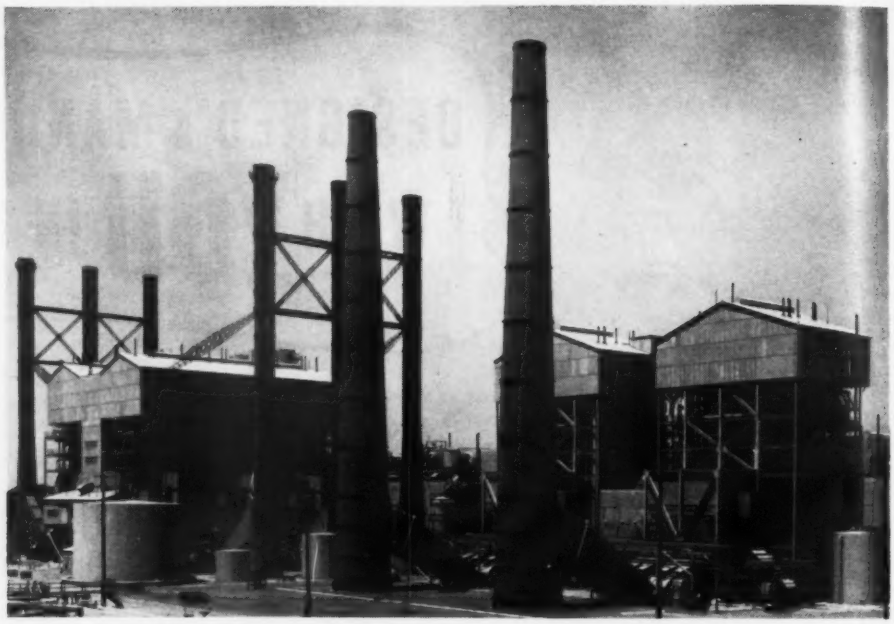
The MOTO-TRUC Co

1963 E. 59th St. • Cleveland 3, Ohio

Pallet . . . Platform . . . Hi-Lift Trucks

LARGEST EXCLUSIVE MANUFACTURER OF "WALKIES"

Send for
Bulletin No. 54



PACIFIC Gas and Electric Co.'s Moss Landing, Calif., station originally had three generating units served by two boilers each. The next two units installed required only one boiler each, served by two stacks in foreground.

Flue gas recirculation helps control steam temperature

Suitable where there are great variations in plant loadings

By
R. A.
BANNISTER
Steam
Superintendent
Coast Valleys
Division
Pacific Gas and
Electric Co.
Salinas, Calif.

WHERE great variations in plant loadings, together with large boiler units, require a wide range of steam temperature control, flue gas recirculation provides one of the most effective means of control and affords other advantages.

A wide range of control is a requirement in many boiler operations. In central station operation, particularly on the Pacific Coast, variations in plant loadings, the larger boilers needed for single boiler—single turbine type construction, and the increase in size of units all contribute to such a temperature control requirement. Control must be maintained not only over a wide range of boiler loadings, but also in many cases in reheat steam temperature as well as main steam.

Steam temperatures as well as pressures are ever increasing, and consequently variation becomes less tolerable. Recent designs call for nearly half of the heat released by the fuel to be absorbed in the superheating and reheating sections of the boiler—thereby placing still more importance on steam temperature controls.

The problem of maintaining maximum turbine efficiency and still not exceeding permissible temperatures is solved effectively by gas recirculation. Another benefit is a result of the considerably reduced superheater and reheater surface compared to other designs, resulting in less slag accumulating surface as well as lower initial cost. This gas recirculation method of temperature control is successfully in use at the Moss Landing steam plant of P.G.&E.

Results are twofold

Physically the gas recirculation cycle consists of a portion of the outgoing flue gas, after the economizer and before the air preheater, being removed by a fan and reinjected into the lower portion of the furnace at the back wall. The results are twofold. First, flue gas containing a high proportion of both carbon dioxide and water vapor, each having a low rate of emission and a high rate of absorption, acts as a filter or blanket to reduce the amount of heat transferred by radiation to the water walls. Second, it increases the mass flow of gas passing over the convection surfaces, giving much the same effect as injecting excess air at the burners.

The fan used to handle this hot flue gas at the Moss Landing steam plant is a 54-in. diameter double inlet—single outlet, backward curved blade fan with a rated capacity of 145,000 cfm. at 690 deg. F. and 3 in. of water differential. The normal gas temperature ranges from 600 deg. F. at low loads to 720 deg. F. at maximum load. The fan is driven by a direct coupled 150 hp. electric motor operating at 1,180 rpm.

Rate of flow through the fan is controlled by inlet dampers. Protective measures against overheating from reversed gas flow when the fan is inoperative consist of: (1) Both the inlet and outlet dampers close automatically when the motor switch is tripped and open when the motor switch is closed. (2) A cold air damper, allowing cool forced draft fan discharge air to enter the fan, opens automatically when the motor switch is tripped and closes when the motor switch is closed.

Actually, main steam and reheat steam temperatures are controlled by a combination of three methods. Spray water attemperation in each of the two portions to prevent exceeding 1,000 deg. F. at the extreme high loads or on rapid increases of load; flue gas recirculation with design excess air effectively controls approximately 60% of the upper operating range of the boiler; and nearly full flue gas recirculation with about 150% excess air for the lower 10% of the boiler range.

These controls of course overlap to a certain extent to obtain smooth transition during load changes. As the P.G.&E. steam plants are often required to operate for extended periods at low loads, the controls have been set to increase the low load excess air above design to assist in sustaining steam temperature. The loss from high excess air is offset by gains in turbine efficiency as a result of higher steam temperatures.

How it works

Referring to the accompanying chart, it can be seen that typical readings for a load of 10% of boiler rating are: Main steam temperature 970 deg. F., reheat steam temperature 950 deg. F., with 150% excess air and recirculating fan dampers at 80% open. Due to low flue gas temperature at this load any damper opening above 80% tends to overload the motor. As load is increased to 20% of boiler rating, the main steam temperature has increased to 980 deg. F., the reheat steam temperature to 970 deg. F. and excess air has been dropped to 60%. The recirculating fan flow is starting to decrease.

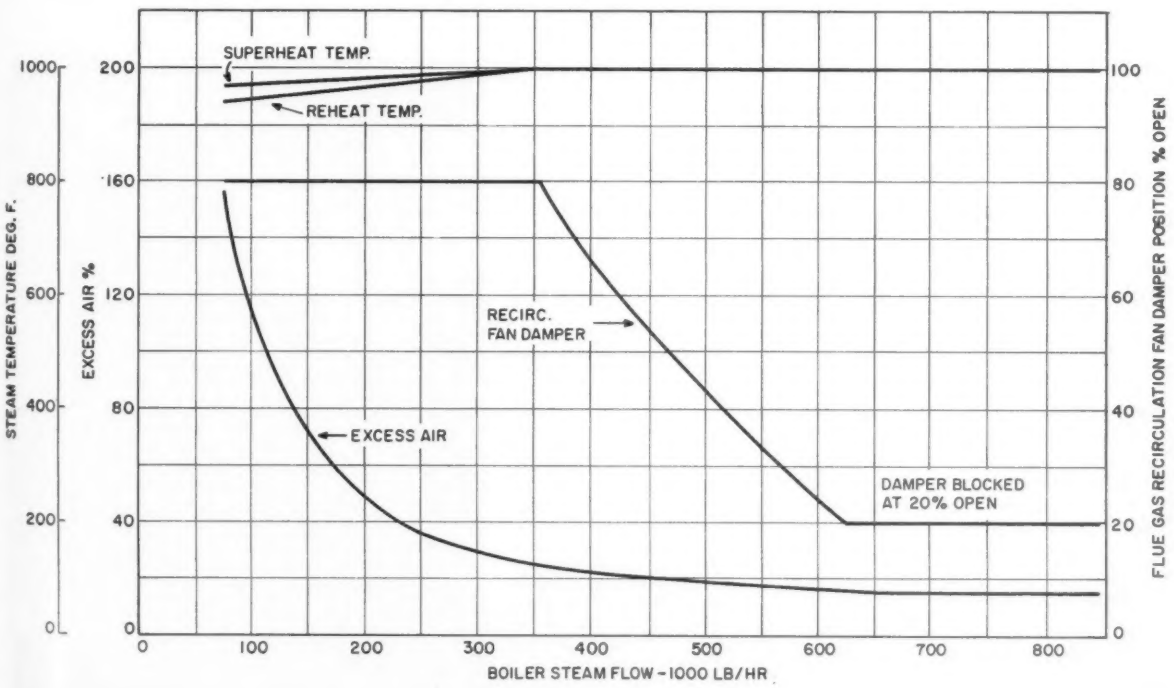
The steam temperature controls at Moss Landing were initially calibrated with new boilers and some allowance was made for aging. As fireside deposits build up and become stabilized, recalibration becomes necessary to obtain optimum control.

Problems encountered

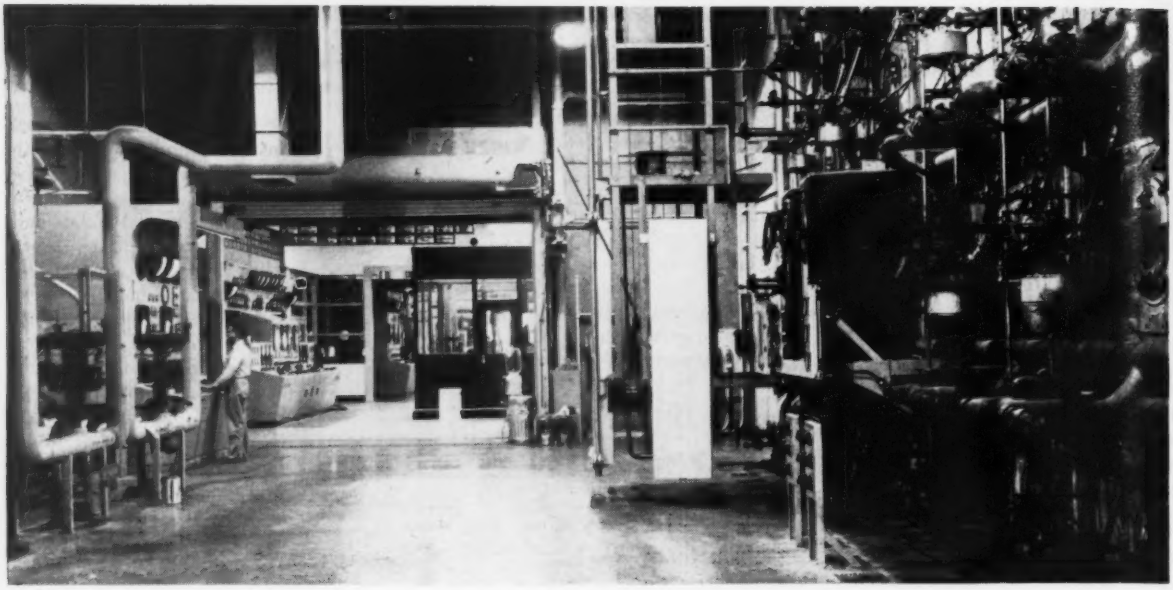
Problems are bound to arise with any new piece of equipment, and the recirculating flue gas fan is no exception. Due to location of the fan and motor at the operating level, problems of alignment and support become evident in vibration. These were for the most part corrected by stiffening of the structural steel and by providing base inertia by the installation of a cement foundation pad.

Excessive vibration, when the fans were started after being shut down with the boiler in service, were indicative of warpage of the motor and bowing of the shaft. The severity of vibration or amount of shaft bow was a function of length of shut-down and also the temperature of the fan at the time of shut-down, which at times could be as high as 750 deg. F.

Rotor warpage was the result of temperature differentials within the fan housing, due to reverse flow of gasses through the fan caused by damper leakage. The rate of reverse flow was a function of boiler load, due to pressure differential between the furnace and economizer outlet. This shaft bow and rotor distortion eventually ran out in operation, but presented a poor operating condition



EFFECT OF GAS RECIRCULATION ON TEMPERATURE CONTROL



BOILER FIRING aisle at Moss Landing, where gas recirculation has provided efficiency and flexibility of temperature control for over a year.

and might well have led to bearing trouble.

Corrective measures have been taken on each of the above troubles. First, the cold air cooling was changed from natural draft to forced draft taking off from the discharge of the forced draft fans. Next, the recirculating fans were left in operation through the full range of boiler loading, rather than being shut down when not required (high loads) as was originally intended. In addition, a turning gear has been installed which keeps the shaft and rotor in motion at all times in case equipment failure should require that the fan be shut down with the steam plants still in service.

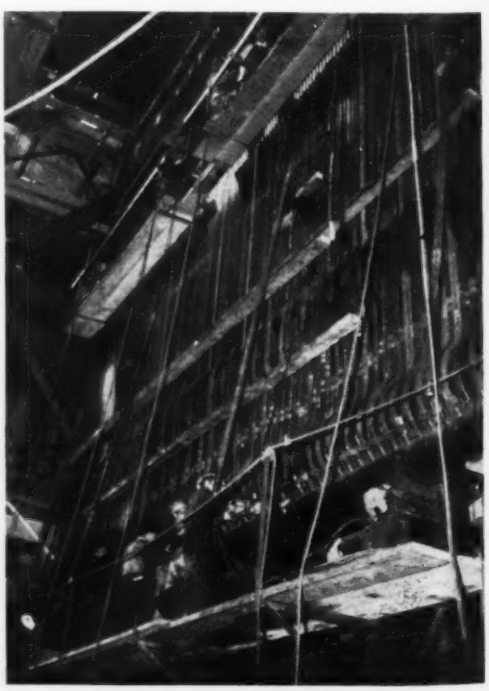
Ignition lost

Another problem in connection with the use of recirculating fans became evident at low loads with considerable instability of burner flame, in some cases even causing loss of ignition of some of the bottom burners. This was obviously caused by the blast of flue gas from the discharge of the recirculating fan. At lower loads the fan is recirculating its maximum quantity of gas, and the air flow through the burner ports is high in relation to burner pressure (due to excess air). This condition disappears at slightly higher loads because of the reduced volume of recirculated gas.

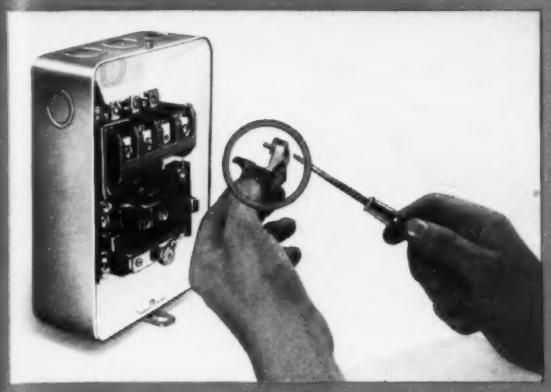
As a temporary corrective measure, the recirculating fan damper controls were taken off automatic and the fan flow was manually reduced. A permanent corrective measure was the installation of plates acting as a deflecting baffle. These plates were welded on to the tubes at the recirculating gas openings into the boiler pointing upwards at an angle of 45 deg., thus directing the gasses upwards and eliminating the blast effect on the lower burners.

Actual operating experience for the past year has indicated that gas recirculation as a means of steam temperature control will live up to its expectations.

The problems which have been encountered are comparatively minor in nature and are rapidly being solved. The efficiency and flexibility of the gas recirculation method of temperature control leads us to believe that it will be recognized as one of the most desirable methods of steam temperature control. Our experience indicates this method of control results in a greater load range with full steam temperature, a desirable feature where load variations are frequent, and lower boiler loads are carried for extended periods.



WATER circulating upward through these 2-in. pipes on the interior blast furnace walls (shown here under construction) is heated at this point, producing 850,000 lb. of steam per hour at a pressure of 1,510 psi.



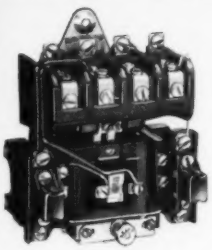
ADD

ONE OR TWO PILOT CONTACTS

to Sizes 0 to 3 Allen-Bradley Solenoid Starters

It's so easy to add one or two extra pilot contacts to Allen-Bradley solenoid starters for operating pilot lights or an additional relay or two. These auxiliary contacts are available with either single pole normally open or normally closed contacts, or with normally open—normally closed contacts.

AUXILIARY CONTACTS FOR BULLETIN 709 SIZES 0 & 1 SOLENOID STARTERS



SIZES 0 & 1 SOLENOID STARTERS

This is a typical Allen-Bradley Size 0 or Size 1 solenoid starter without external auxiliary contacts.

AUXILIARY CONTACTS SIZES 0 & 1

These are two Bulletin 895 auxiliary pilot contacts which are attached to the arc hoods of Bulletin 709 Sizes 0 and 1 solenoid starters. Be sure to specify the size of starter when ordering these Bulletin 895 auxiliary contacts.

ONE AUXILIARY CONTACT

Here is the same Bulletin 709 solenoid starter with one auxiliary contact fastened to the arc hood.

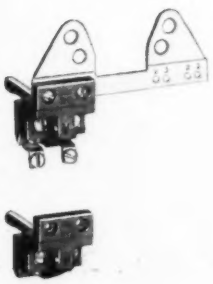
TWO AUXILIARY CONTACTS

This is the same Bulletin 709 starter to which have been added two Bulletin 895 auxiliary contacts.

AUXILIARY CONTACTS FOR BULLETIN 709 SIZES 2 & 3 SOLENOID STARTERS

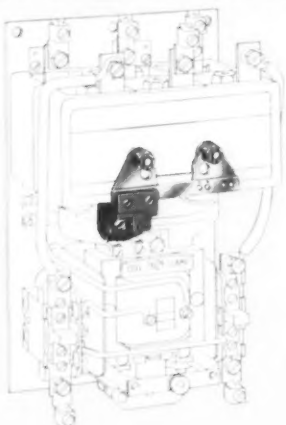
SIZES 2 & 3 SOLENOID STARTERS

This is a typical standard Allen-Bradley Size 2 or Size 3 solenoid starter with no auxiliary contacts. Arc hood bolts are used to hold auxiliary contact mounting plate.



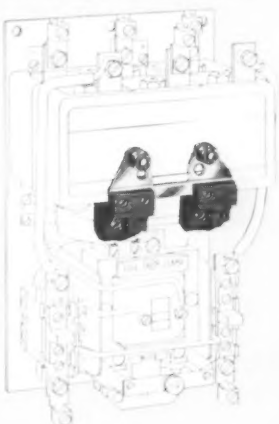
AUXILIARY CONTACTS SIZES 2 & 3

The mounting plate, shown above, is required to support the auxiliary pilot contacts on these larger starters. The same mounting plate fits the Size 2 or Size 3 arc hood bolts. It holds one or two auxiliary contacts, as shown at the right.



ONE AUXILIARY CONTACT

Here is the Size 2 or Size 3 Bulletin 709 solenoid starter to which has been added one Bulletin 895 auxiliary contact. No disturbance of existing wiring in the starter.



TWO AUXILIARY CONTACTS

This is the Size 2 or Size 3 Bulletin 709 solenoid starter equipped with two Bulletin 895 auxiliary contacts on one mounting plate. These contacts are easy to install.

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.

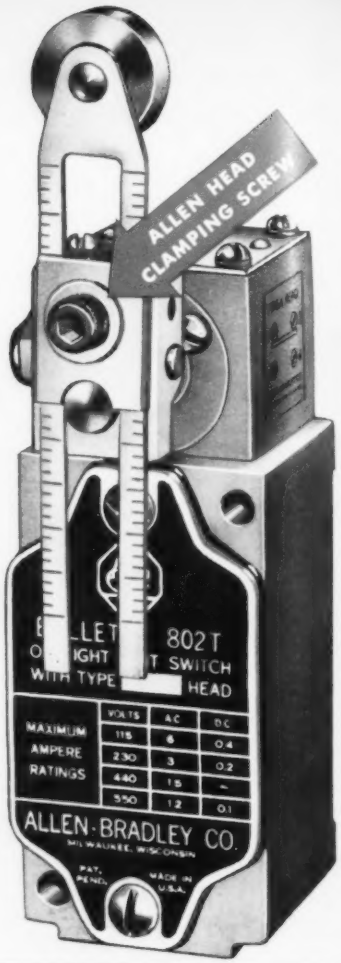
In Canada:
Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

4-55-M

NEW!

OILTIGHT LIMIT SWITCH
WITH ADJUSTABLE OPERATING LEVER



Another handy unit has been added to the broad line of Allen-Bradley oiltight limit switches... the NEW Type 802TG limit switch. The operating lever is adjustable from ¾ inch to 3 inches in radius.

The lever can be set at any angle on the shaft, and the operating head can be placed in any one of four positions—0—90—180—270 degrees on the body of the switch.

Like all Bulletin 802T limit switches shown here, the new unit has a snap action switch with double break, silver contacts. There is one normally open and one normally closed contact... electrically separated and protected by an oiltight seal. Terminals are easily accessible.

Roller Lever Maintained Contact

Flush Plate for Mounting Limit Switch in Cavity

Roller Lever Spring Return

Send for this 8-Page Bulletin

Bulletin 802T is a handy selection guide for picking the limit switch best adapted to your needs. Write for your copy, today.

ALLEN-BRADLEY
QUALITY
LIMIT SWITCHES

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis. • In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

Fork Lever Maintained Contact

Flush Mounted Fork Lever

Rod Type Spring Return

Top Push Rod Spring Return

Push Roller Spring Return

Side Push Rod Spring Return

Side Push Rod Maintained Contact

4-55-MR

Patent policy survey

. . . shows inventors' royalty arrangements with Western firms

By RICHARD E. SHAFER
Assistant to President
Professional Consultants, Inc.
Los Angeles

A SURVEY has been completed among a number of manufacturers as to their policies governing:

1. Inventions made by employees in line with the employer's business, whether or not conceived or developed on company time, or as the result of an assigned duty.

2. Inventions submitted from outside the company.

Policies of firms submitting data are not individually identified in this discussion. No attempt was made to cover all the companies in any field. Only sufficient coverage was desired to indicate general trends and policies. In a few cases, companies advised that their policies were undergoing minor revisions.

The firms include: Bendix, Convair, E. I. duPont, Fairchild, General Electric, General Motors, Lincoln Electric, Lockheed, North American Aviation, Pacific Airmotive, Packard-Bell, R.C.A., Western Electric, and Westinghouse.

In most cases, as a condition of employment, technical employees sign an agreement to assign to the employer any and all rights to subsequent inventions related to the interests of the employer, whether or not made on company time.

Considerations, in addition to the salary, in some companies include a payment ranging from $25 to $100 when a patent application is filed, and an equal payment when the patent issues. A few companies pay the inventor 20% on the first $100,000, 10% on the next $400,000, and 5% on any sums over $500,000 net income resulting from manufacture or licensing of the employee's invention for other manufacturers.

The royalty payments are good for the life of the patent, whether the inventor remains with the employer or not, and the payments are made to the deceased inventor's heirs. Rights to cancel or modify the royalty agreements are reserved by the employer, except that agreements previously in effect are not alterable by later revisions or cancellations.

Frequently, inventions made on government contracts are owned by the government or are available for free license to the government or other government contractors. In some cases employer associations have licensing agreements among member employers. One of the companies pays the employee 30% up to the first $1,000,

BENDIX AVIATION CORPORATION
NEW DEVICE ORGANIZATION
INFORMATION BLANK

From
. . . . . .

Person submitting . . . . . .
Address . . . . . .
Inventor's full name . . . . . .
Address . . . . . .

1. Subject of invention . . . . . .
2. Is this device patented? . . . . . No. . . . . Date . . . . . .
3. Is there an application filed and pending in patent office? . . . . No. . . . Date . . . . . .
4. Name of patent attorney . . . . . .
   Address . . . . . .
5. Do you have clear title? . . . . . If not name those having an interest . . . . . .
   . . . . . .
6. Name construction features you believe to be new—different—or better . . . . . .
   . . . . . .
7. Have any licenses been issued, if patented, or commitments made if pending? . . . . . .
   . . . . . .
8. Have you built a working device? . . . . . When? . . . . . .
   Can you demonstrate the device? . . . . . .
9. Has novelty search been made? . . . . . Has infringement search been made? . . . . . .
10. Have you had any practical experience in this line of subject matter? . . . . . .
11. Have you disclosed this device or subject matter to others, if not patented? . . . . . .
12. Name those to whom you have made disclosure . . . . . .
    . . . . . .
13. Have any other patents been issued to same inventor? . . . . . .
14. Make a list of enclosures if submission is made with this information blank.

Signed . . . . . .
Place . . . . . .
Date . . . . . .

15. Please state on opposite side on what basis you propose to deal with Bendix Aviation Corporation in evaluating your device.
16. ☐ Check this square if you have included any remarks on reverse of this sheet.

One of the twelve strapping stations set up by Quaker Export Packaging Co. to handle "Operation Poinsettia."

Signode power machines strap 600,000 cartons of food for export in 30 days!

Start November 14th and package 3,592,500 food parcels for shipment overseas in time for Christmas? It was done—in an amazing demonstration of fast organization and sustained effort, with the parcels packed six to a carton, cartons sealed, and reinforced with two steel straps.

Says Benjamin Bernstein, President, Quaker Export Packaging Co., Inc., Philadelphia, "In approximately thirty working days we applied over 1,250,000 straps. During the entire operation there was no major breakdown. This proves the excellence of the design and engineering of the machine, and the excellent service and installation."

This is unitizing on a big scale (and on a hurry-up basis . . . in little more than a week after the first call from Quaker Export, Signode had delivered the power strapping machines and set them up for operation).

Dependability—and experienced, helpful follow-through—are part of every item in the complete line of Signode hand and power tools for tensional steel strapping. For additional information, or a survey of your needs, write,

SIGNODE Steel Strapping Co.

383 Brannan St., San Francisco 7, Calif.
659 E. Gage Ave., Los Angeles 1, Calif.
1519 N.W. Irving St., Portland, Oregon
Offices coast to coast—Foreign subsidiaries and distributors world-wide.
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

25% on the next $1,000, and 20% on the amount above $2,000 of income realized from the invention.

In most cases, the employee is voluntarily given greater consideration for promotions, and in a few cases cash amounts up to $5,000 for outstanding profitable inventions, even though there may be no formal percentage agreement beyond the regular salary or wage.

Most of the agreements do not require formal release by the employer for inventions outside any of the employer's interests.

Outsiders' inventions

For inventions submitted from outside the company, payments are usually handled on an individually negotiated basis. Most companies prefer a patent application to have been filed prior to submitting application, a copy of witnessed descriptions is usually acceptable.

Inventors are cautioned that the company usually has a staff of trained specialists who are constantly developing new items and are familiar with the history and trends in their fields. It sometimes happens that individuals outside of a particular field assume they have something new or practical, and frequently the same item is "invented" by different individuals at intervals over a long period.

The companies usually have a policy booklet and/or form explaining that no confidential relationship is established by the submission of the data or models. (A representative form accompanying is by courtesy of Bendix Aviation.) Many times an idea submitted has already been accomplished in the company.

Unpatentable inventions

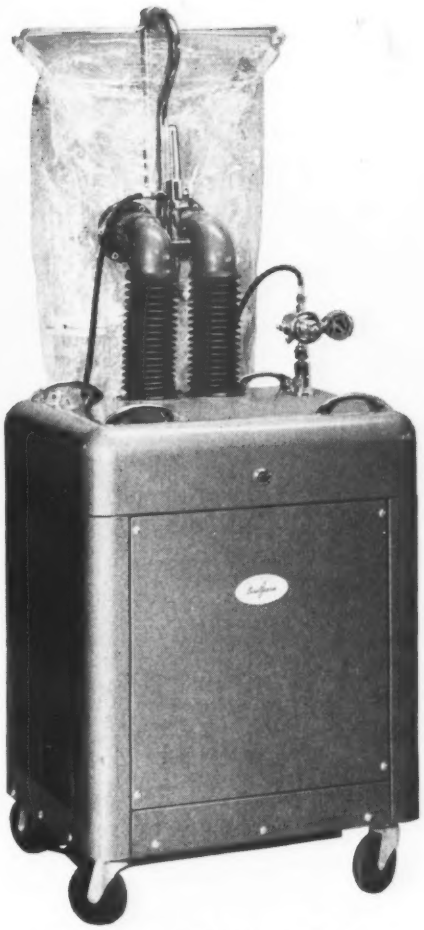
Payments are generally made when justified. Outside of payments for the engineering performed by the inventor, large payments are generally not made for unpatentable inventions because the company would be put at a disadvantage by having competitors copy the device anyway. The same comments apply as far as "designing around" the inventors claims on patented items.

In general, companies are interested in examining new items and in working out mutually agreeable arrangements. There is little doubt that some of the largest dollar volume comes from items which are not patented, but which are properly promoted, distributed, and sold. However, patents form the backbone of many industries.

Southern Oxygen Company portable Oxygen Tent with circulating and cooling system is the result of 30 years of experience.

when life hangs in the balance

National SINCE 1910 of . . . california



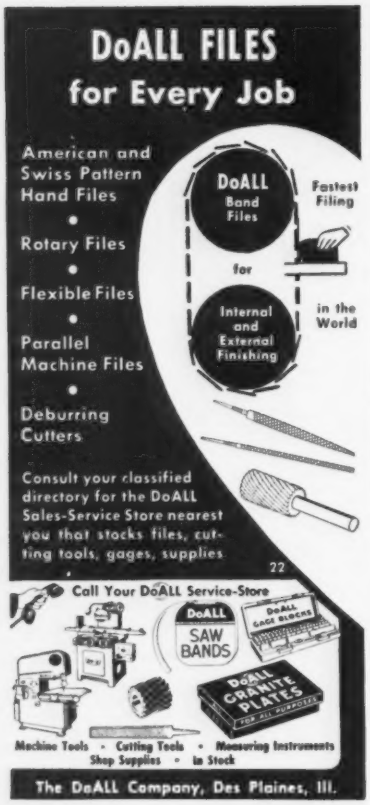
. . . and, because only the finest regulator assures maximum safety and dependability, NATIONAL of California regulators are chosen.

only the very finest equipment can meet the challenge • • •

Some thirty years ago, SOUTHERN OXYGEN COMPANY with plants located in Maryland, Tennessee, North Carolina and New Jersey, perfected the first portable oxygen tent with circulating and cooling system to operate in any climate and to give the patient maximum comfort with dependable safety. Naturally, this experienced manufacturer of gases and of medical equipment carefully tested all types of pressure regulators . . . and it selected the two-stage reduction regulators made by NATIONAL of California because they proved easier to operate, less subject to refrigeration effects, more able to hold the required oxygen pressure adjustment and of longer service life. When oxygen regulators are employed in the crucial tasks of saving lives and ministering to the comfort of the sick, only the very finest equipment merits selection. These same lasting qualities and operating advantages will be yours when you too select these regulator makes for your industrial needs.

we cordially invite you to write today—for free copy of a beautifully illustrated, 44 page, regulator brochure.

NATIONAL welding equipment company... 544 DEPT. 140 218 fremont street san francisco 5 california


DoALL FILES
for Every Job
American and Swiss Pattern Hand Files
Rotary Files
Flexible Files
Parallel Machine Files
Deburring Cutters
DoALL Band Files
Fastest Filing
for
Internal and External Finishing
in the World
Consult your classified directory for the DoALL Sales-Service Store nearest you that stocks files, cutting tools, gages, supplies
22
Call Your DoALL Service-Store
DoALL SAW BANDS
DoALL GAGE BLOCKS
DoALL GRANITE PLATES
Machine Tools • Cutting Tools • Measuring Instruments
Shop Supplies • In Stock
The DoALL Company, Des Plaines, Ill.

WSC CONFERENCE on light metals

EXPANDED use of light metals in new products will be the subject of a May 4, 5, and 6 conference to be held at Washington State College, Pullman, Wash., sponsored by WSC's Division of Industrial Services in cooperation with the Aluminum Co. of America, Dow Chemical Co., Kaiser Aluminum and Chemical Co., and Reynolds Metals Co.

MAINTENANCE MEET Bigger program planned

A TECHNICAL CONFERENCE program considerably expanded beyond last year's Plant Maintenance Conference held in Los Angeles is being planned for the meeting this year in connection with the second Western Plant Maintenance and Engineering Show. It will be held again in Los Angeles, July 12-14, with conference sessions at the Ambassador Hotel and the show at Pan Pacific Auditorium.

Problems of setting up effective maintenance programs in large and small plants will be discussed at the opening general session, with supervisory planning and scheduling in big plants and multiple responsibilties in the small plant handled at the second general session.

Sectional meetings will include preventive maintenance (measuring cost against savings, coordinating records, gaging expenses of scheduled inspection procedures), lubrication, cost control, corrosion, building maintenance, project control, and electrical maintenance.

Attendance applications are being received from many large Eastern industrial cities, as well as from the eleven Western states.

LARGEST PLASTIC PIPE is being tooled

TOOLING of the largest polyester resin, fibre-glass reinforced plastic pipe ever produced is under way at Reflin Co., Gardena, Calif. The 12-in. pipe has been ordered by the City of Los Angeles Department of Water and Power for its Valley steam generating power plant, under construction in the San Fernando Valley.

A Bell System Credit Card belongs in every businessman's wallet

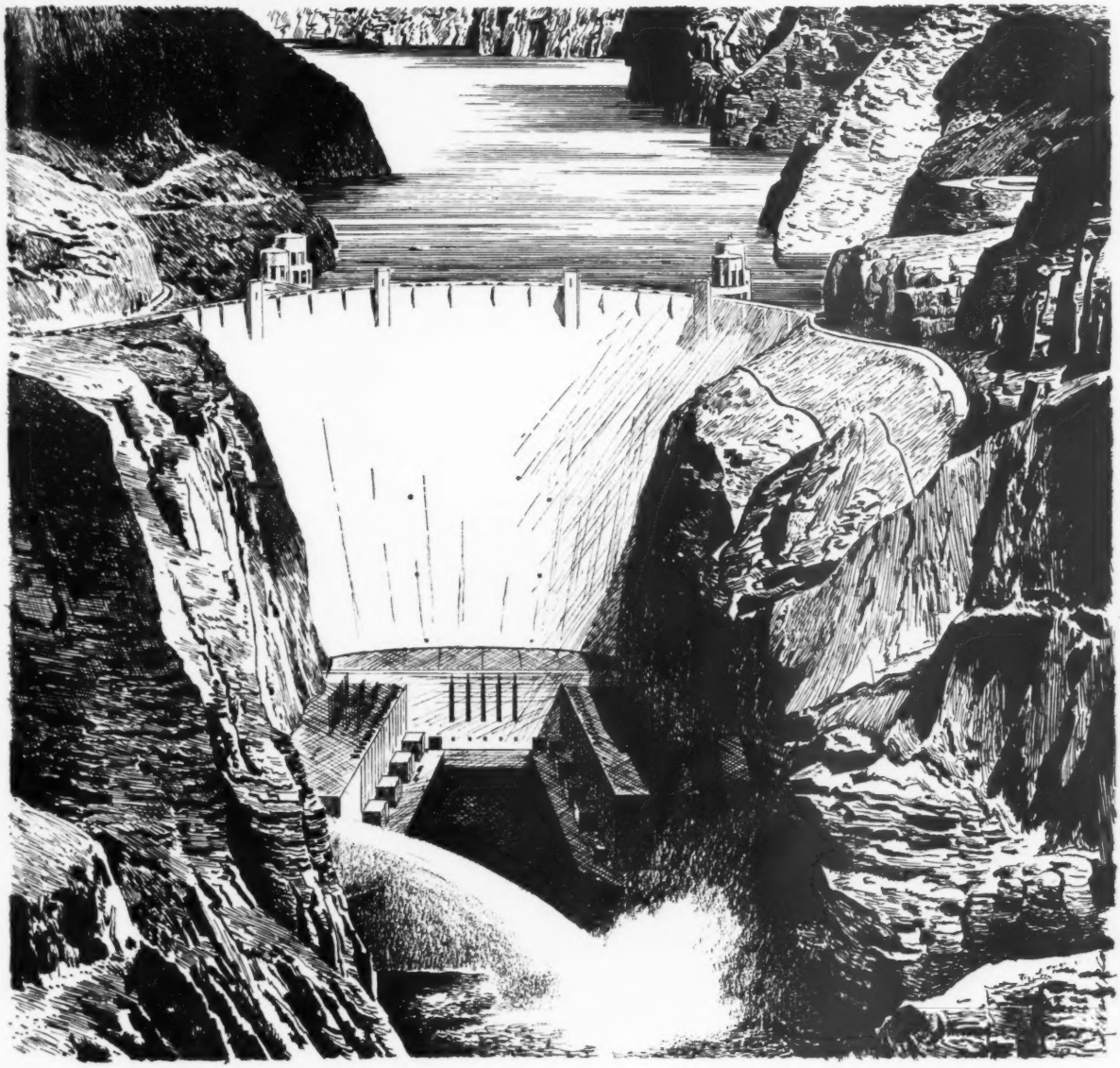
Certainly your key people — and probably all your salesmen — should have a Bell System Credit Card. They can use it to "charge" long distance calls from hotels, public telephones, clubs — from any telephone in the United States. There is no charge for credit cards . . . no additional charge for a Credit Card call. And you can have all business calls appear on the office telephone bill so you can easily analyze the profitable results of telephone visits.

Easy to use. Your Bell System Credit Card is simple to use. Just give the long distance operator the information as shown on the reverse of the credit card.

Credit Cards are only one of many special long distance services we offer to businessmen. A Pacific Telephone representative will be glad to discuss ways of putting Credit Cards and other useful services to work for you. Just call our business office for more information.

Pacific Telephone

UNITED STATES STEEL AT WORK IN THE WEST—completed 1936, Hoover Dam is still world's tallest



TAMING A RIVER . . . with the help of steel!

Rising 727 feet from the canyon floor, mighty Hoover Dam forces the Colorado River to provide a reliable, unvarying supply of water and power to 8,000,000 people in a three-state area. 93,000 tons of steel form the vital organs of Hoover Dam: valves, penstocks, pipes, gates, reinforcing and structural steel . . . and by far the largest portion came from the mills of United States Steel.

Yesterday, Today, and Tomorrow—Columbia-Geneva has for years helped to fill the steel needs of the West. We hope that when you need steel, you'll continue to look first to Columbia-Geneva, Western producing member of the industrial family that serves the nation—United States Steel.

West's Largest Steel Producer

United States Steel Corporation · Columbia-Geneva Steel Division

SAN FRANCISCO · LOS ANGELES · PORTLAND · SEATTLE · SALT LAKE CITY · DENVER

USS TRADE MARK

UNITED STATES STEEL

Movie industry rapidly retooling

Wide screens, smarter sets strive to combat TV blight

NOT since talking pictures turned Hollywood upside down a quarter-century ago, has the motion picture industry undertaken such a general retooling as is now in progress. Millions of dollars' worth of new equipment for the wide screen process reached producing studios during 1954 and further far-reaching changes are in prospect.

When "Bwana Devil," first of the crop of 3D pictures, sent its lions and tigers cavorting across a king-sized screen and seemingly into the laps of pop-eyed audiences, major producers warily held off until convinced that 3D was the long-sought secret weapon against the blight of television. But by 1954's end, every major studio except Republic was turning out wide-screen pictures, most of them under Twentieth Century-Fox's Cinemascope process.

In 1955 the industry will make fewer but more spectacular pictures, an unprecedented proportion of them "A" productions budgeted at more than a million dollars, and every major studio has at least one $5,000,000 super-colossal on its schedule.

Problems to face

King-sized pictures have brought king-sized manufacturing problems such as these:

1. Fantastic optical systems that squeeze the rectangular pictures into squarish shape on film, then unsqueeze them in projection to a wide picture that seemingly enfolds the viewer into the heart of the action.

2. Enormous sound stages to accommodate the large casts and wide sweep of action.

3. Tremendously powerful set lighting equipment. One type of spotlight, for instance, has been boosted in light intensity from 30,000 to 150,000 lumens.

4. Third-dimensional sound systems to match the 3D pictures. Cinemascope, for instance, records on four separate magnetic sound tracks instead of one.

5. Finer quality of detail in color negatives and prints because of the greater blow-up in projection.

6. Jumbo screens, expanded from 40 ft. width to as much as 140 ft.. curved instead of flat.

7. Five-fold power in theater projectors, to bring pictures to full brilliance. In 1955, screens will be about three times as bright as in 1954.

8. Additional loudspeaker systems behind the huge curved screens, electrically coordinated with the multiple sound tracks.

Cost cutting

With costs zooming, producers have been cooperating through the industry's Motion Picture Research Council. not only to write design specifications for equipment manufacturers, but also to develop production shortcuts.

Studio shops recently have been substituting plastic molding for many cutting and forming operations. Polystyrene beads, placed in closed molds and subjected to steam, expand to fill the mold and assume the desired shape. For situations where possibility of injury to players is involved, study is being given various foams such as the phenolic foams and the isocyanate foams developed in Germany, as materials for breakaway furniture and other props. Large polystyrene, vinyl chloride, and other plastic sheets are heated and formed over plastic molds to create such bulky but intricate objects as suits of armor.

By an unusual chemical casting process, an acrylic monomer now is combined with polymers to produce water-clear transparent sheets up to 10 x 10 feet in size, so perfect they can be used as optical filters. Placed over windows and doors of indoor sets, these giant panels filter the daylight coming through from outside to match accurately the studio's incandescent lighting, avoiding bluish images.

Movie set savings

On some Hollywood lots, storage space is so valuable that studio managers would prefer to throw away minor set props, such as structural walls. They are getting their wish by virtue of several cost-saving methods. Structural walls, for instance, are fabricated in sections as large as 20 ft. square by pouring a thin coat of plaster into a mold lying flat on the floor, adding a layer or two of onion sacking, then another thin coat of plaster, in which then is imbedded a light wooden skeleton for rigidity. When the plaster hardens, the unit is ready to be raised into place as a self-supporting and very light wall section.

For more intricate shapes, polyesters may replace plaster where repeated use justifies higher material costs. Large thin areas are backed by thin wood or fiberboard stiffeners cross-joined to brace in all directions. Since most spectaculars are shot in full color, the polyesters score heavily because they can be given beautiful coloration through direct admixture of dyes or pigments.

New synthetics make possible a paint vehicle without the many shortcomings of the glue-sized paint traditionally used on scenic backgrounds. It is non-peeling, mold proof, can be sprayed without warming, and dries so quickly that a second color can be superimposed immediately without smearing.

Another process has been invaluable in recent spectaculars depicting the splendors of life in the golden palaces of ancient Egypt and Rome. By a double spray method, studio technicians apply silver nitrate and a reducing solution simultaneously, followed by a transparent colored lacquer. Result is an authentic gold gleam. heretofore unattainable, which can be applied to architectural details, statuary, and other complex objects.

Huge scenic structural backgrounds now are being engineered for mobility. Low four-wheeled dollies, placed end to end or sideways in trains, are attached or built into the set at the studio lumber mill. Thus an entire background may be towed away to

STANDARD ENGINEER'S REPORT

DATA

LUBRICANT: Calol O.H.T. Grease

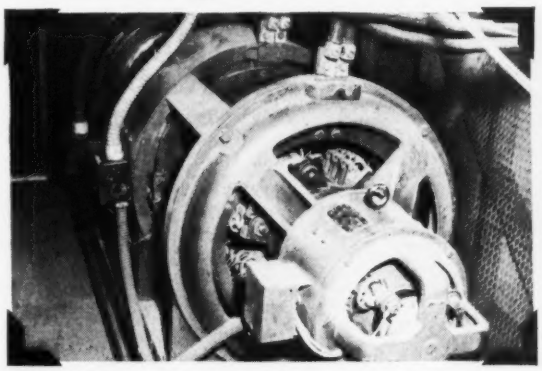
UNITS: Electric motor bearings—fractional to 100 H.P.

OPERATION: Machine tools, furnaces, generators

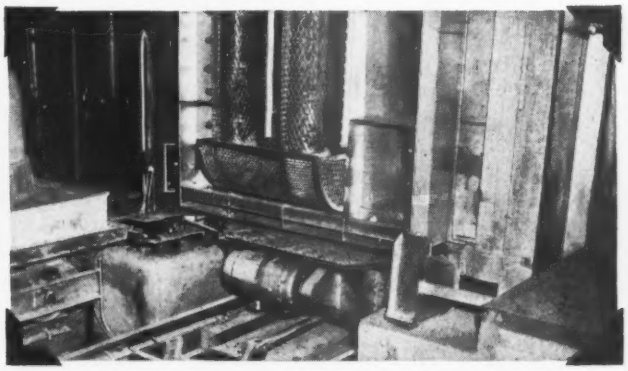
CONDITIONS: High ambient temperatures

FIRM: Ryan Aeronautical Company, San Diego, Calif.

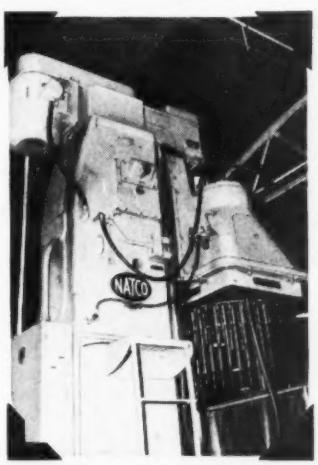
Special grease ups lubrication period to 5 years!



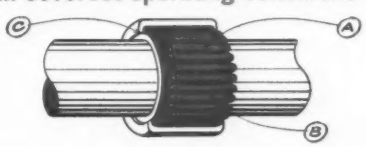
1900 MOTORS, from this 100 H.P. motor-generator set to fractional H.P. units, are lubricated on a 5-year-interval schedule with Calol OHT Grease in the Ryan Aeronautical Company plant, San Diego, Calif. All grease gun fittings were removed after tests proved this special grease efficient in motors under exceptionally high ambient temperatures. The motor above is constantly in temperatures of 150°F. plus. It operates doors, and cars, loaded with jet-engine afterburners, for this heat-treating furnace.



CALOL O.H.T. GREASE also lubricates many motors for Ryan that operate under heavy loads, such as this 25 H.P. motor which runs the specially-designed 42-spindle multiple drill shown at right. Sealed in bearings, it has ended motor repairs brought about in the past in the Ryan plant by overlubrication and occasional missing of a fitting. This special grease is recommended for all types of bearings.



How Calol O.H.T. Grease protects bearings in severest operating conditions



Used in any type of bearing under any operating condition, high temperature-low speed, high speeds to 10,000 rpm, temperatures from minus 10°F. to 400°F., Calol O.H.T. Grease will last indefinitely.

A. Contains special oxidation inhibitor—helps prevent rusting, corrosion, hardening of grease at any time.
B. Resists high temperatures—eliminates coking and formation of deposits.
C. Provides excellent seal against water ...lubricates efficiently in slight moisture.

FREE CATALOG: "How to Save Money on Equipment Operation", a booklet full of valuable information, is ready for you. Write or ask for your free copy today.

CALOL

TRADEMARK "CALOL" REG. U.S. PAT. OFF.

STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA

Do YOU have a HARD-TO-PACK Product?

LET

STANLEY ®

STEEL STRAPPING

DO THE JOB

Easier...Faster...Better

The Tool Division of Hubbard & Company, Pittsburgh, Pa., manufacturers of railroad maintenance tools, wanted to pack four sledge hammers in one bundle, yet keep container needs to a minimum for economy's sake. Another requirement was protection of the hammer heads' bright finish, which has sales appeal value. Here, another difficult packing job was made easy by using Stanley Steel Strapping.

The heads of the four hammers are encased in a "semi-carton" and bound in place by two bands of ½" Stanley Steel Strapping, applied with the Stanley ACE Strapping Tool. *Four* hard-to-pack products become *one* compact, secure and economical package.

The Stanley Steel Strapping Specialist has ideas that will improve *your* materials handling operation. He'll *prove* that Stanley has steel strapping hand and power tools that will pack *any* product easier, faster, safer.

Mail coupon today for free Catalog and to arrange an obligation-free appointment.

STANLEY INSURE IT – SECURE IT WITH STANLEY STEEL STRAPPING

STEEL STRAPPING DIVISION

THE STANLEY WORKS

STANLEY STEEL STRAPPING DIVISION, 1064-S LAKE ST., NEW BRITAIN, CONN.
Telephone: BAldwin 9-2021

☐ *Please send Catalog SS-9C.* ☐ *Please have Representative call.*

NAME_____

POSITION_____

COMPANY_____

CO. ADDRESS_____

CITY_____ ZONE____ STATE_____

STANLEY TOOLS • STANLEY HARDWARE • STANLEY ELECTRIC TOOLS
STANLEY STEEL STRAPPING • STANLEY STEEL

storage without dismantling; or, to accommodate a shooting schedule, a Roman temple may be temporarily sidetracked while a few Egyptian pyramids are wheeled into place.

The booming drive-in theater industry, which has grown lustily despite TV, looks for still greater expansion, especially through the East where it is still a novelty. The "ozoners" have been switching to wide screens as rapidly as possible, but a new difficulty has appeared. In expanding the picture to king size, screen brilliance may drop from its usual five lamberts, or half the brilliance of the ordinary indoor screen, to as little as two lamberts, dangerously approaching the one-lambert value of moonlight.

Following successful tests last summer, the Motion Picture Research Council has released to manufacturers a new giant screen design which it says can be successfully mass-produced. More than 100 ft. wide, as compared with the usual 40-ft. width, the outdoor screen is made of extruded aluminum strips ⅛ in wide, interlocking so as to form a continuous fluted surface.

Its unprecedented brilliance depends on precision work, carried to tolerance of only .001 in., but the huge screen is said to double outdoor theater capacity, permitting showing to as many as 2,000 cars. Now some operators in cold climates are talking of putting roofs over their parking areas to extend the season and some are now furnishing each car with an individual electric heater. Though this means costlier operation, many an operator has been making more in a five-month season than many an indoor theater could net in several years.

FREEZEPROOFING of waste dump cars

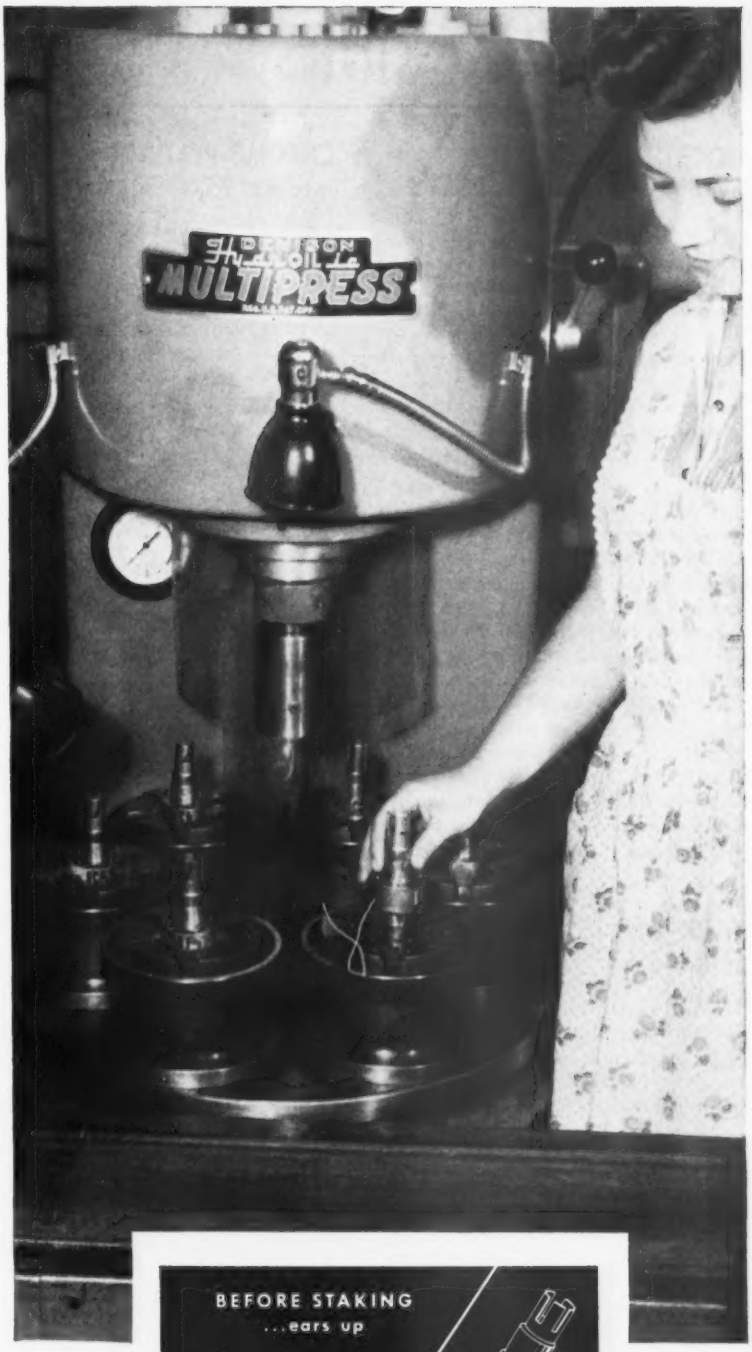
SPRAYING inside surfaces of empty rail cars with a solution of magnesium chloride brine has been found to be a practical means of freezeproofing waste dump cars by Utah Copper division of Kennecott Copper Corp., effectively preventing waste material from sticking to surfaces during winter dumping operations.

Previous attempts at a practical means of freezeproofing included spraying of calcium chloride, oils, Great Salt Lake water, and even heating and shaking of the cars.

The firm is also attempting to further reduce dust from its tailings pond. A system of huge sprays covering the dust problem areas has proven very effective.

...another cost-saving idea from DENISON

Stakes 475 assemblies an hour with DENISON MULTIPRESS®



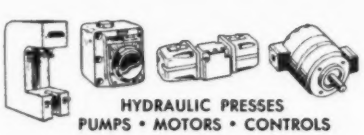
Job. Stake sub-assembly of door-lock retractor by pinning back 4 ears.

Method. Load sub-assemblies from conveyor line to Denison Index Table. Table automatically indexes sub-assembly beneath hydraulic ram of Denison Multipress. Accurately controlled single stroke of hydraulic ram pins back 4 ears. Results are uniform. Production . . . 475 units an hour.

Your Benefit. If your work calls for staking, riveting, forming, crimping or trimming, Denison can show you how to simplify operations, speed production and cut costs. Ask a Denison Engineer to study your job and show you how. Write.

THE
DENISON ENGINEERING COMPANY
1184 Dublin Road, Columbus 16, Ohio

DENISON *HydrOILics*



HYDRAULIC PRESSES
PUMPS • MOTORS • CONTROLS

EFFICIENCY KINKS

LOCATING LEAKS with uranium

AT Rohr Aircraft Corp.'s Chula Vista plant, pressurized aircraft fuselages and components must be sealed to a specific level. During manufacture of these components, personnel on the outside of the pressurized structure must find the leak and transmit its location to the worker inside so that it may be sealed as rapidly as possible.

Quite often it is difficult to pinpoint a location inside a complex structure by verbal instructions. In order to facilitate checking leaks, Rohr has developed a method whereby a vial of harmless radioactive material is held outside the enclosure at a point where leakage occurs while the inside man pinpoints the leak location with a portable Geiger counter. The signal light on the Geiger counter assumes maximum intensity when passing over the direct line of the radioactive source so that horizontal and vertical scanning will reveal the leak location quickly and accurately—sometimes in only a few seconds.

TANK CAR settles down

UTILIZATION of a railway tank car for storing liquid ammonia is proving to be an efficient substitute for an expensive tank arrangement at the Agricultural Fertilizer Co. of Edison, Calif.

A two-ton Worthington fertilizer mixer was being operated and the company wanted to ammoniate phosphates by the introduction of liquid anydrous ammonia into the fertilizer charged with phosphates. An ammonia transfer unit was needed which could transfer liquid ammonia from tank car to storage plant and then remove vapors left in the tank car. Since the company lacked storage facilities and the cost of a suitable storage tank was prohibitive, Worthington Corp. engineers designed a system whereby the tank itself was used for storage. An LPGA transfer unit and a small, inexpensive ammonia tank with liquid level controller are used to supply gas to the transfer unit during the times when liquid ammonia is being forced from the tank car. A metering device in the liquid ammonia line to the fertilizer mixer automatically controls the amount of ammonia for each batch.

CHROME PLATING cuts cost 75%

Friden Calculating Machine Co., San Leandro, Calif., has called Herbert C. Hand's suggestion to chrome plate all finger pads used on automatic screw machines "the most valuable suggestion ever submitted by an automatic screw machine employee."

Feed finger pads hold onto stock and feed it into machinery. After each feed they slide back over the stock and repeat the operation of feeding required by the screw machine. Such constant operation soon wears out the pads.

The harder chrome finish now used has meant a 75% reduction in the cost Friden formerly expended to replace finger pads. Pads now last twice as long, and when the chrome pads wear down. they are sandblasted and then replated.

Contributions wanted

For each contribution to Efficiency Kinks which the editors feel merits publication, WESTERN INDUSTRY will be happy to award $5.00. Please send in any details of how your plant solved some problems of design, production, maintenance, or process.

We are particularly interested in ideas that contribute to the efficiency of production and the reduction of operating costs, novel or new methods of pollution reduction and waste utilization, as well as adaptation of old tools and processes to do new jobs.

Send contributions to Efficiency Kinks Editor, WESTERN INDUSTRY, 609 Mission Street, San Francisco 5, Calif.

THIS induction heating unit, coupled to a wire cutter, bonds bared wires automatically.

WIRE STRIPPER-TINNER saves $40,000

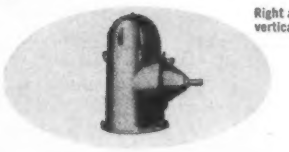
DEVELOPMENT of an induction heating unit, married to an automatic Artos wire cutter and stripper, automatically bonds together bared wires at the same instant that the cutting and stripping is accomplished in the machine. LearCal Division of Lear, Inc., Santa Monica, Calif., has saved approximately $40,000 annually by this operation, which eliminates costly hand operations and at the same time increases quality and uniformity.

Lear uses several million feet of electronic hookup wire, the majority of which must be cut in lengths ranging from 3 to 5 in. Stranded ends, under the old method, were twisted and tinned by hand before being used in electronic chassis assembly.

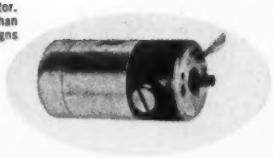
Torq-Master, used with torque converters and fluid couplings in the lumber industry

Giant gear and rack

Right angle vertical pump drive



Miniature motor. One of more than 50 basic designs



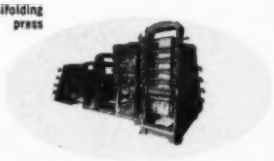
Pacific, G-E gearmotor

look to WESTERN GEAR for

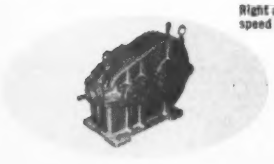
- custom engineering
- specialized machinery for every purpose
- complete line of electro-mechanical catalog products
- gears of all types and sizes

Illustrated are only a few of the wide variety of both custom and standard products designed and manufactured by Western Gear.

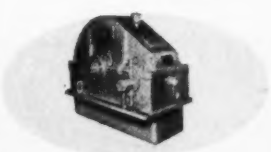
Manifolding press



Right angle speed reducer



High speed unit

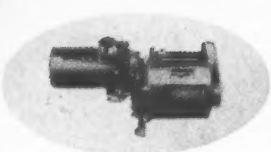


Centrifugal blower, one of many design sizes

Helicopter rotor drive unit

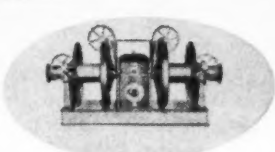
Sea-Master marine gear

Miniature precision differential unit



Aircraft cable drum type hoist, hydraulic, pneumatic or electric drive

Trawl winch



Rotary actuator powered by both hydraulic and electric motors. One of hundreds of basic designs

Horizontal stabilizer actuator unit. AC and DC power providing three speeds for manual, auto pilot and coarse control

"The difference is reliability" • *Since 1888*

Engineering service available without obligation. Let us quote you on your needs.

WESTERN GEAR

PACIFIC-WESTERN PRODUCTS | POWER TRANSMISSION GEARS • MACHINERY •

Address Executive Offices, Western Gear, P.O. Box 182, Lynwood, California

PLANTS AT LYNWOOD, PASADENA, BELMONT, SAN FRANCISCO (CALIF.), SEATTLE AND HOUSTON... REPRESENTATIVES IN PRINCIPAL CITIES

5461

ANSWERS TO YOUR PUMP PROBLEMS

These New TUTHILL Catalogs Give You Complete Data on Pumps for

LUBRICATION, HYDRAULIC, COOLANT, TRANSFER and BURNING OILS Service.

CATALOG 101—(Model L Series) Mechanically-sealed pumps.in capacities from ½ to 6 g.p.m. and pressures to 600 p.s.i.

CATALOG 102—(Model C Series) General purpose pumps in capacities from 2 to 200 g.p.m. and pressures to 100 p.s.i.

CATALOG 103—(Model CK Series) High pressure pumps in capacities from 5 to 200 g.p.m. and pressures to 400 p.s.i.

CATALOG 104—(Model M Series) Coolant pumps with automatic internal by-pass. Capacities from 2 to 50 g.p.m. and pressures to 15 p.s.i.

CATALOG 105—(Model R Series) Automatic reversing pumps in capacities from ¾ to 200 g.p.m. and pressures to 100 p.s.i.

CATALOG 106—(Types S and SA) Stripped pumps for built-in applications. Capacities from ½ to 200 g.p.m. and pressures to 100 p.s.i.

CATALOG 107—(Type SU) Multiple V-belt pumping units in capacities from 2 to 50 g.p.m. and pressures to 300 p.s.i.

Tuthill pumps are of the rotary, internal-gear, positive displacement type.

Any one or more of these Tuthill catalogs are available on request. They include individual pump guides to help you select the Tuthill pump best-suited to your requirements. Please ask for catalogs by number.

TUTHILL PUMP COMPANY

Dependable Rotary Pumps since 1927

939 East 95th Street, Chicago 19, Illinois

Sales Representatives:

Westco Pump Sales Company, 85 Industrial Street
San Francisco 24, California, VAlencia 6-5104

Wagner Hydraulic Company, 10633 Wellworth Avenue
Los Angeles 24, Calif., ARizona 8-5332 and BRadshaw 2-2091

TITANIUM UNEQUALED despite costly forming

TITANIUM, "the wonder metal," has found some pretty rough going since it was first heralded as the answer to everybody's problem, but in spite of the barriers of high cost and difficuty of forming, several unequaled properties of the metal have kept it of number one importance.

Titanium is as strong as the best steel alloys and only half as heavy. It is twice as heavy as aluminum but exceeds this metal in hardness, strength, and corrosion and heat resistance.

Erosion and cavitation tests put titanium in a class by itself, and there are promising indications that titanium may have phenomenally high service life. For example, weight loss for the titanium alloy TI 150-A was only one-sixth as much as for standard turbine-blade steel in the U. S. Navy wet-stream erosion tests.

Since this new metal first became available in production quantities, aircraft designers have come to regard it as an essential in many types of aircraft. Supersonic aircraft use titanium in many vital parts. Compressors wheels and blades, fire walls, shrouds, cowling, and skin-sections are a few of the places where titanium's high strength-to-weight ratio and excellent corrosion resistance do the job better than any other structural metal can.

As faster and faster speeds are demanded, and larger and more powerful engines required, stronger airplanes become necessary. By using titanium for jet engine parts, a saving of over 200 pounds is made possible in the weight of each engine. This weight saving is multiplied by a saving in structural metal needed to support the 200 pounds.

Many chemical processors have found that titanium's exceptional resistance to many forms of attack makes it an ideal choice for them.

Scale removal

A process developed in Boeing Airplane Co.'s engineering process unit is helping solve problems of scale removal from titanium after heat treatment, by converting normal scale to a form which will later permit more convenient removal.

Certain carbonates combine with some nitrates, in the proper proportions, to furnish a very effective crystalline coating. The nitrates present act as oxidizers and tend to convert the normal scale oxides into oxides of higher oxygen content or different crystalline structure.

Carbonates present in the pre-coating are believed to convert the normal scale oxides or the higher oxides into a titanate form which is not tenacious. Overall scale produced by the mixture may be a combination of higher oxides and titanates.

The new scale, produced by the coating and the heat treatment, appears to have a different coefficient of expansion from the metal surface; on cooling, a portion of it cracks and can be removed with a little gentle rubbing. That which remains can be removed by a single brief pickle in a modified conventional nitric-hydrofluoric acid pickling solution.

Increasingly large titanium remelting furnaces, and substitution of a special vacuum melting procedure for conventional inert gas atmospheres in such furnaces, have had considerable effect on metal quality and point the way to significant cost reduction, according to the Titanium Metals Corp. of America at Henderson, Nev. A 20-ton automatic double-melting furnace of proprietary design completely remelts 4,000-lb. titanium ingots with improved homogeneity.

DoALL DIAL INDICATORS and INDICATING GAGES

including all types of anvils, tools and holders

- Choice of Graduations
- Balanced or Continuous Dials
- Shock Proof Movements and Jeweled Bearings available

Consult your classified phone directory for the DoALL Sales-Service Store nearest you

DoALL Dial Indicator with a DoALL Micro-Step Gage Block Assembly

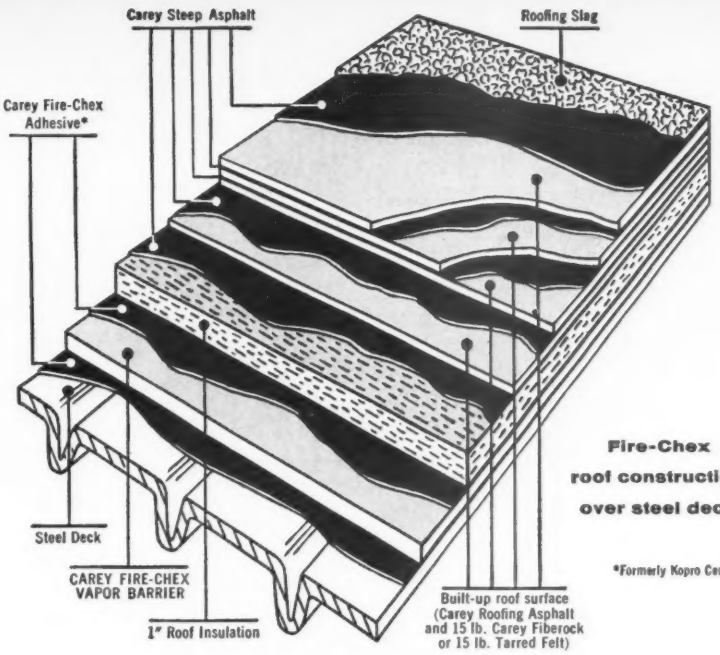
30

Call Your DoALL Service-Store

Machine Tools • Cutting Tools • Measuring Instruments
Shop Supplies • In Stock

The DoALL Company, Des Plaines, Ill.

Removes all doubt about the fire-safety of built-up roofing!


Carey Steep Asphalt
Roofing Slag
Carey Fire-Chex Adhesive*
Steel Deck
CAREY FIRE-CHEX VAPOR BARRIER
1" Roof Insulation
Built-up roof surface (Carey Roofing Asphalt and 15 lb. Carey Fiberock or 15 lb. Tarred Felt)

Fire-Chex roof construction over steel deck

*Formerly Kopro Cement

Carey Fire-Chex Asbestos-Plastic Vapor Barrier

Application is Easy—
Simply apply Carey Fire-Chex Adhesive* with brush or spray over entire deck. When adhesive becomes tacky . . .

Apply a full 36" wide sheet of Fire-Chex Vapor Barrier, sanded side to deck. Allow 3" side lap, 6" end lap.

Seal both ends securely with Fire-Chex Adhesive. Continue application, lapping each sheet 3". Now apply insulation and built-up roofing.

In Carey FIRE-CHEX, you have a vapor barrier that *does not contribute to fire and cause it to spread!* Even when installed over a standard steel deck that becomes red-hot in a fire, FIRE-CHEX remains intact—*does not release melting asphalt and excessive gases!* Product of over a million dollars invested in development, tests *prove* FIRE-CHEX removes all doubt about fire-safety in built-up roofing.

Why take chances with ordinary, hazardous vapor barriers that have been responsible for multi-million-dollar industrial plant fires? FIRE-CHEX assures you priceless protection for your buildings—*and is available for just a few cents more per square* than the conventional type.

Write today for a sample of this Carey dependable product, and for your copy of the FIRE-CHEX Specification Sheet. Or, request a Carey Industrial Sales Engineer to call. Address Dept. WI-4.

Serving Industry, Farm and Home Since 1873

Carey

Asbestos-Plastic
Fire-Chex Vapor Barrier
. . . does not contribute to fire!

THE PHILIP CAREY MANUFACTURING CO. Lockland, Cincinnati 15, Ohio In Canada: The Philip Carey Co., Ltd., Montreal 3, P. Q.

Built-up Roofs • Asbestos and Asphalt Saturated Felts • Roof Coatings and Cements • Fiber-Flex Glass Roof System
Careystone Corrugated Asbestos-cement Roofing & Siding • Thermal Insulations

TIMELY TIPS
for tool engineers

THERE ARE certain fundamentals which tool engineers should take into consideration when selecting material from which to make a die or tool. A. V. Luebbers, Jr., chief metallurgist and R. H. Lundquist, metallurgist of California-Doran Heat Treating Co., Los Angeles, conspired at the ASTE show in Los Angeles to provide the tool engineer with this checklist.

1. Select the proper material. The tool engineer must know what type of tool steel is required before selecting the grade. If a die is intricate and of varying cross section, he should not use a water hardening grade. Close dimensional tolerance dictates one grade and hot working properties another.

2. Buy raw materials large enough. It is quite common for some tool makers to try to conserve raw material costs and leave mill surface on some areas. The as-forged or as-rolled surface is necessarily decarburized by forging or mill rolling and is likely to cause warping and/or cracking. Even if the stresses set up by the decarburized surface are not great enough to create problems, there are certain imperfections in a mill surface which might cause stress risers sufficiently great to cause cracking. A minimum of 1/32 in., and preferably 1/16 in., should be removed from all surfaces of the tool before heat treatment.

3. Stress relieve before finish-machining. If considerable amounts of stock must be removed from a die or tool in machining prior to heat treatment, there remains a high residual stress. This stress might be large enough to cause excessive warpage or even cracking during heat treatment.

4. Stress relieve after straightening. If a tool or die warps in the machining process and must be straightened before finishing for heat treating, stress relieve after straightening. Stress relieve by thermal treatment after straightening and before finishing and sending to the heat treater.

5. Remember that all steels are subject to warpage and dimensional change. There is no such thing as "non-deforming" tool steel, but in some steels the magnitude of the changes is considerably less than for others. The tool engineer should know by experience and careful checking what changes to expect in manganese or low chrome, tungsten oil hardening, 1% carbon 5% chrome air hardening, 1.5% carbon, 12% chrome air hardening, high-speed steels, and any other grades commonly used.

Allowance should be made in design of the die or tool, by allowing stock for finish grinding, to take care of the normal amount of movement to be expected from the grade selected. If these allowances cannot be made, another grade, which experience shows will remove less, must be selected. Total dimensional change of a tool steel is a function of its size. The The larger the section, the greater the total change. If an intricate large die must be held to extremely close tolerances, it should probably be made in sections rather than one piece so that hand fitting can take care of normal volumetric changes.

6. Grind properly. Improper grinding technique after heat treating can waste many hours of tedious work. The proper grade of grinding wheels should be chosen carefully and additional care taken not to feed too rapidly. Stresses set up by abusive grinding are necessarily in tension, and even though cracking may not occur, the residual stresses will possibly cause premature service failure.

TEMPORARY TOOLING

Specialized Small Irregular Shaped Parts

- ☒ STAMPED
- ☒ FORMED
- ☒ PIERCED
- ☒ EXTRUDED
- ☒ STENCILLED
- ☒ TAPPED
- ☒ COUNTERSUNK

Years of tooling experience, combined with modern machines has proven over the past 20 years that the temporary die method is the most economical for model work and small production runs.

NOW SERVING THE WESTERN STATES

SHORT RUN Stamping Co.

2231 CHICO STREET
EL MONTE, CALIF.
(A Suburb of Los Angeles)

Send prints for firm quotation and detailed cost comparison.

MAIL PRINTS TODAY!
or Call
CUmberland 3-4109

STAMPINGS in SMALL LOTS

You can see why Magcoa rail Dockboards perform better...

Look underneath to see important *extras* that make Magcoa rail Dockboards perform better *and longer:* Magcoa locking members and Magcoa structural members.

Magcoa locking members are extruded magnesium channels extending the full distance required for a safe, slip-proof fit between rail car and dock. Outer edges are precision welded to the bottom of the Dockboard; rugged magnesium plate is welded to each end of the channel for extra strength to withstand the brutal repeated thrusts of high speed lift trucks and heavy loads.

Magcoa structural members are engineered to give maximum distribution of load weight across the entire Dockboard. Size and number of structural channels or I-beams used is determined by your specific loading requirements. Structural members are always positioned *within* the end limits of the locking members for protection.

Write for bulletin, "Look *Under* Magcoa Dockboards."

MAGNESIUM COMPANY OF AMERICA
1012 El Segundo Blvd. El Segundo (L.A.), Calif.

SMALL BOAT BUILDING still tapering off

CONSTRUCTION of ships and small boats in the 11 Western states was something less than satisfactory during 1954. No new government orders for small boats were placed during the year and commercial fishing fleet orders amounted to practically nothing.

Small boats

Associated Boat Industries of Northern California reports that there are currently 22,000 small sports craft and fishing boats on San Francisco Bay and rivers—12,000 kept on the water and the other 10,000 small sail boats and trailer boats stored out of the water.

It has been estimated that there are 6,000 to 7,000 commercial fishing boats now operating in Northern California waters with a yearly fleet increase of around 1,200. Fishing boats in Southern California number around 60,000, pushing the total number of small boats of all kinds in the state to somewhere near 100,000.

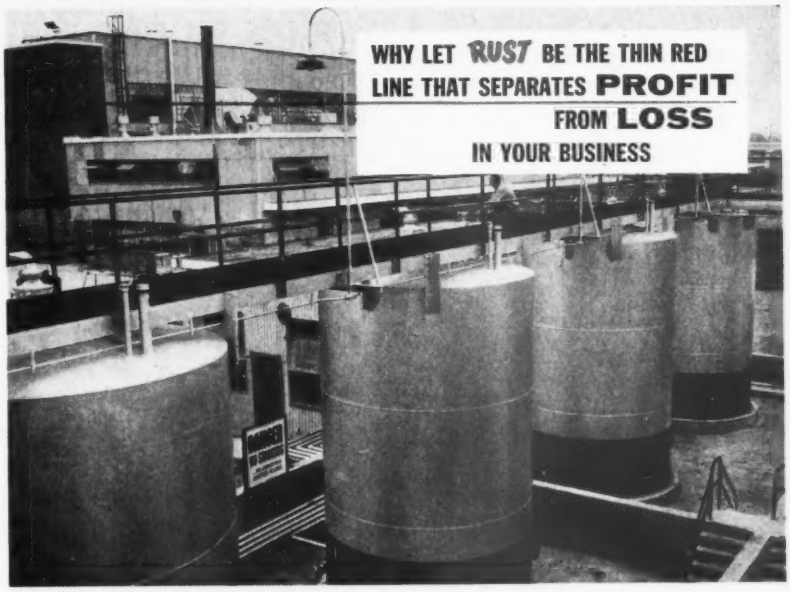
In 1953 $11,000,000 was spent for upkeep of boats in Northern California.

Puget Sound

Estimated total of small boats in the Puget Sound is 45,000.

Martinac Shipyard in Tacoma, Wash., is in process of delivering its fourth AM class minesweeper to the Navy. This will leave the company with five to complete, one of which is under subcontract to Bayview Shipyards. Puget Sound Boat Building Corp. has completed all government work and is not currently operating as a shipyard. Pacific Boatbuilding Co. was bought in its entirety by Tacoma Boatbuilding Co., Inc., and has been absorbed into the latter organization as Plant No. 2. It is not now operating as a shipyard.

Kazulin & Cole Shipbuilding Corp. has completed all of its government commitments and is currently engaged in building gillnet boats for the commercial fishing trade. Western Boat Building Co. is engaged in repair work but has no current program for new construction. Tacoma Boatbuilding Co., Inc., has completed all government contracts except one which involves the construction of three AM class minesweepers. This contract has approximately one year to run. Tacoma Boat's facilities for repair have been materially increased and it has become very active in ship repair.

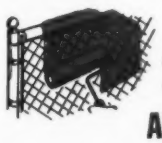


Cut Maintenance and Replacement Costs caused by RUST

Prime Metal Surfaces with RUSTMASTER Now!

Rustmaster, powerful rust inhibitor developed by GENERAL PAINT, slashes maintenance and replacement costs, because it shields metal structures and fixtures from rust damage for as long as 10-15 years . . . thus extends working life of expensive equipment and buildings.

Rustmaster saves labor, too, because you can apply it without costly sand blasting or pre-cleaning, wherever such preparation is impractical. Just remove loose rust and scale with wire brush or scraper, then brush, dip or spray on Rustmaster. Once applied it won't crack, chip or peel!



It's a natural for use on machinery, metal windows and doors, towers, tanks, structural steel, truck bodies, fences—and scores of other metal surfaces exposed to fog, smog, rain, corrosive fumes, and humidity.

Absorbs Old Rust—Prevents New Rust!

Rustmaster literally absorbs old rust by penetrating right down to metal underneath. There it forms a tight bond, that prevents new rust from forming on either old or new surfaces.

FREE SAMPLE: Why not make a Rustmaster on-the-job test? Write today on your company letterhead for descriptive folder and free sample . . . enough to paint a garden cart, wheel barrow, or several test boards. Please address Dept. 4B

IM-7

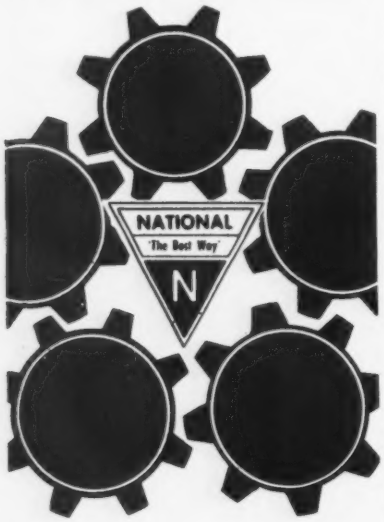
General Paint CORPORATION

P. O. Box 3474, Rincon Annex, San Francisco 19, Calif.
Dealers and Branches Throughout the West and Southwest

Specialized Industrial, Building & Maintenance Paints • Custom Product Finishes
Marine Paints • 5-Star Professional Finishes • Home Decorator Products

NOW . . .

A SHIPPING SERVICE



geared to WESTERN INDUSTRY needs

Whenever you ship to or from the East, specify NATIONAL CARLOADING CORPORATION. We expedite your shipments—provide a complete one-company transportation service regardless of the number of routes involved. Your shipment is under our care all the way—and you get only one bill! All this service at *no extra cost!*

NATIONAL The Best Way N

FMB NO. 366

Call or write for FREE LITERATURE

A COMPLETE TRANSPORTATION SERVICE

National Carloading Corporation

Judson Sheldon Division—
Judson Freight Forwarding Division
19 Rector Street, New York 6, N. Y.
Pacific Coast Div. Headquarters
345 South Spring St., Los Angeles, Cal., Trinity 8421
District Office: 6625 White-Henry-Stuart Bldg.
Seattle Wash., Mutual 1490
District Office: 245 California St., San Francisco, Cal.

TINLESS TIN CANS: problems and prospects

TINLESS cans of the future are expected to come from a number of metals including untinned steel, specially treated steel, aluminum, and steel coated with aluminum, zinc, and possibly nickel, according to a paper presented at the 14th annual meeting of the Institute of Food Technologists at Los Angeles, by R. H. Lueck, K. W. Brighton, and R. W. Pilcher of American Can Co.'s research and technical department.

Steel-coated cans

For the foreseeable future, most of the tin-free metal cans must be manufactured from steel or steel coated with other metals. No other metal is produced in sufficient quantity to meet the needs of 35,600,000,000 metal cans produced annually.

Untinned steel is the least expensive sheet metal and its mechanical properties are essentially the same as those of tin plate. However, untinned steel must be enameled on both sides to prevent corrosion, whereas electrolytic plate can be used for many products just as it is received, without any organic coating.

Several methods of welding black plate and other sheet metals have been investigated, but welding problems are totally unlike any that have been encountered heretofore. Nevertheless, the results obtained have been encouraging enough to continue research and it is quite possible welding will play a more important role in can making in the future.

Cements are the newest of the can making materials, although for many years bumped side seams have been doped with shellac and other substances. At present most quart motor oil cans are made of CMQ black plate with cemented side seams. The cementing procedure is being rapidly extended into other styles and sizes of cans.

It will not only make it possible to produce tin-free containers for many items, but also provide cans with all-around lithography. The cementing procedure is expected to be applicable to all of the potential alternates.

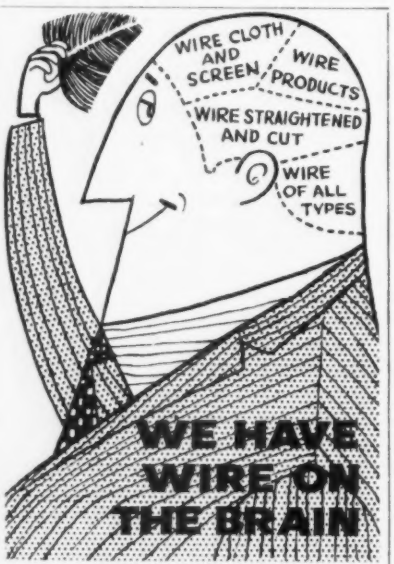
High potential

From the standpoint of both the mill production and factory fabrication facilities, untinned steel has one of the highest potentials as a replacement for tin plate. It may be that the development of the metal with improved surface properties is all that is needed to accelerate the transition.

It is likely that chemically treated plate will be one of the first alternates for tin plate. It should be applicable to the ends of cans for low-acid food products and also for the bodies if ways can be found of soldering it. Extension of cementing techniques for side-seam closure should make it possible to employ the plate in cans for a number of hard-to-hold products which do not require processing.

The possibility of aluminum's serving as an alternate plate would seem to depend upon its physical and chemical properties and upon its price. The fact that, gage for gage, aluminum is only 36% as heavy as tin plate is advantageous. Relative softness of the pure metal is one of the greatest disadvantages. Can manufacturers working with aluminum must take into consideration composition and temper, as well as gage, in tailoring a can to given requirements.

Although zinc plated steel and nickel plated steel have been considered for some time, indications are that these plates may be applicable only for certain classes of products for which other alternates are not suitable.



IMMEDIATE DELIVERY

INDUSTRIAL Wire PRODUCTS

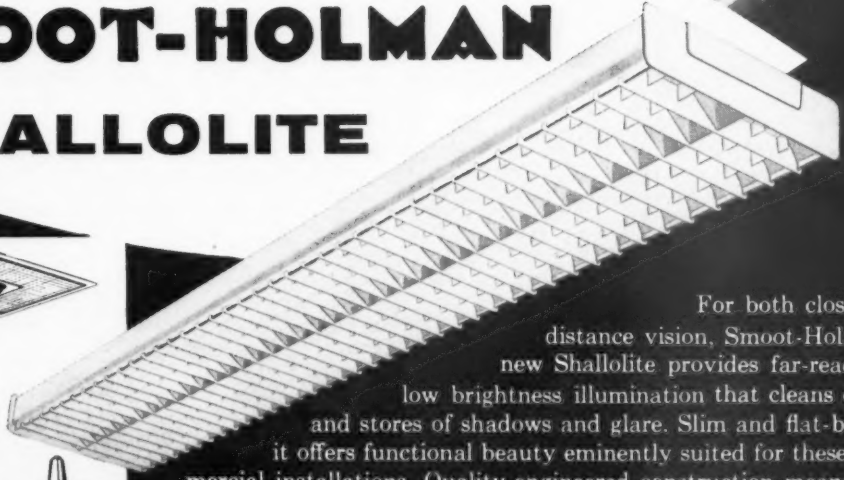
CORPORATION
5649 ALHAMBRA AVE. • CA 27131
LOS ANGELES 32, CALIFORNIA
431 WESTWOOD DR. • PL 5-5463
• SAN ANTONIO 12, TEXAS
4868 PINE ST. • HO 9-3753 • LA MESA, CALIF

Maximum seeing for this task

And for this one

Specify the efficiency, the quality, the functional beauty of

SMOOT-HOLMAN SHALLOLITE



For both close and distance vision, Smoot-Holman's new Shallolite provides far-reaching, low brightness illumination that cleans offices and stores of shadows and glare. Slim and flat-bodied it offers functional beauty eminently suited for these commercial installations. Quality-engineered construction means long service with low cost, easy maintenance. Pendants available.

Look to **SMOOT-HOLMAN** *for Quality*

ILLUMINATION EQUIPMENT
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA
MADE IN U.S.A.

Sales Offices in Most Principal Cities
San Francisco • Branch Office & Warehouse

Send coupon for full information

SMOOT-HOLMAN COMPANY
P. O. Box 398 • Dept. 106 • Inglewood, California

Please send me complete literature.
I am particularly interested in:

☐ SHALLOLITE ☐ SCHOOL OR INSTITUTIONAL
☐ COMMERCIAL ☐ INDUSTRIAL ☐ FLOOD

NAME _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

OPTIMISM VOICED AT ARIZONA WORKSHOP
Speakers point out state's many advantages

ARIZONA, growing faster than any other state in the West except California, held an industrial development workshop conference at Tucson March 18-19, at which ideas for promoting the industrial growth of the state were exchanged. While the main attendance was from chambers of commerce, banks, and public officials, nevertheless there was a good sprinkling of people from industry itself.

Aircraft and electronics are the lines having greatest growth at the present time, and the possibility of Boeing setting up a modification center at Tucson indicates still further developments.

Points brought out by speakers included the following:

Arizona is in fine position for industrial growth, located between the two big markets, Southern California and Texas. It offers high-grade labor and living conditions. Other states have learned that it is possible to overbuild their water supply, labor, and other resources. Arizona can afford to be selective in this regard. Community-wide participation in industrial development is needed.—*Stuart P. Walsh, Industrial Survey Associates, San Francisco.*

Arizona is gaining rapidly in population on Colorado, Oregon, and Washington, and by 1965, with 1,500,000 people, will be nearly up to Colorado. The southern belt of the eleven Western states is having the greatest growth, due in considerable measure to the desire for more outdoor living. —*A. C. Prendergast, editor,* WESTERN INDUSTRY.

Air-conditioned land

AiResearch selected Arizona for its first branch plant because its new products required tolerances so fine that they must have exacting temperature control during fabrication to insure against expansions and contractions, which could only be possible in a completely air-conditioned plant. Also wanted new labor market, and Arizona plant is located within two hours flying time of Los Angeles. Adequate overnight truck service provides a constant flow of raw materials and finished parts between the two installations. Tool supply houses, small machine shops, and the like have followed in order to be close to that company's Arizona facilities and to those of Hughes and Douglas.

If you take a map of the southwestern United States and put Arizona in the hub, you can project a wheel of transportation facilities that serves this entire area in a matter of hours. As a traffic man, I can see Arizona as a major distributing center with overnight service to such prime marketing areas as Los Angeles, San Diego, Albuquerque, and within 48 hours to El Paso and San Francisco. One of the obstacles has been the inequitable freight rate structure. For the last 16 months a statewide transportation committee has been endeavoring to get class rates to and from the East reduced so that Arizona will be able to take advantage of its geographical location and for the first time have a definite advantage over the major California cities.—*Jay A. Barbeau, traffic manager, AiResearch Manufacturing Co. of Arizona.*

Industries are attracted by such special inducements as a good industrial district, with the opportunity to buy sites and construct their own plants or to enter into a lease-rental agreement for buildings to be built or already constructed—*Oscar Monrad, vice president, First National Bank and Trust Co., Oklahoma City.*

Copper, cattle, cotton

Arizona always has its "three Cs," copper, cattle, and cotton, to which we now can add citrus and climate, but Arizonians need to wake up to their industrial possibilities. — *R. W. F. Schmidt, manager, Tucson Airport Authority.*

Arizona is a natural for textile mills of a certain type, on account of climate. Our S-1 cotton, the longest short-staple variety, is unusually suited to spinning high grade combed thread yarns. — *Arthur S. Mann, manager industrial department, Tucson chamber of commerce.*

Three kinds of industries Arizona doesn't want are the here-today-gone-tomorrow type, the cyclical type affected by economic fluctuations, and the sweatshop type. Amending our tax laws helped materially to get industry here.—*Herbert A. Leggett, vice president, Valley National Bank of Arizona.*

Steps taken by the Valley National Bank to promote development were encouraging the government to establish plants and bases in Arizona, organizing a local group to buy the state's largest utility from eastern interests, establishing an investment company to finance new business and help out existing concerns.—*Walter A. Bimson, chairman, Valley National Bank of Arizona.*

WORK STATUS
pinpointed by radio

PRODUCTION flow has been stepped up, saving $100,000 per year at Lockheed Aircraft Corp., Burbank, Calif., through the installation of a new "wired wireless" communication system developed by company engineers. The closed circuit intercom system has reduced tracking-down action, which frequently required two days' walking time, to a matter of minutes.

Superimposed upon the existing public address wires, the system consists of three central stations, each with a master control panel, which tie in directly with a total of 30 transmitter-receiver units at production points within the fabrication and subassembly shops. From the master control station a production coordinator can, by a switch and selective ringing situation, contact any one or all stations in the area and trace work status of specific items.

The past 16-month operation of the wired wireless system has presented these advantages:

1. Elimination of costly delays in locating shop orders.
2. Prompt issuance of flagging instructions to area control personnel.
3. Close shop control over work orders which have critical or emergency requirements.

Wired wireless, or carrier current intercommunication, is practically the same system as radio broadcasting, the principal difference being the conductor of the current. In broadcast transmission the carrier current is emitted into space, while in the wired wireless version the energy is confined to a metallic conductor which may be a telephone line, public address wiring, power and light wiring, or even a barbed wire fence.

LOCKHEED greatly reduces tracking-down time with a "wired wireless" intercom.

Ready to Roll!

Shippers know that dependability is the key to good motor freight service.
Every Consolidated Freightways terminal is geared to produce *on-time*
schedule departures like this one. Positive control of vehicles
in transit is assured by a central dispatching system,
with its leased wire teletype network.
One more reason why thousands of shippers rely on CF—*every day.*
Next time, route *your* shipment via Consolidated Freightways.

SEATTLE • PORTLAND • SAN FRANCISCO - OAKLAND • LOS ANGELES • SPOKANE • SALT LAKE CITY • MINNEAPOLIS - ST. PAUL • CHICAGO
Terminals in 49 other key cities from the Pacific Coast to the Great Lakes... Thru service to all major eastern cities

DoALL "CLAW-TOOTH"
SAW BANDS
Cut Faster • Last Longer

- Teeth pull themselves into work
- Cut metals, woods, plastics
- For all contour and cut-off bandsaws
- An "all-purpose" blade

DoALL has it in stock!

Consult classified directory for the DoAll Sales-Service Store near you . . .

2, 3, 4, 6 pitch
¼" to 1½" widths
100 ft. coils
or cut and
welded
lengths

Call Your DoALL Service-Store

DoALL SAW BANDS
DoALL GAGE BLOCKS
DoALL GRANITE PLATES

Machine Tools • Cutting Tools • Measuring Instruments
Shop Supplies • In Stock

The DoALL Company, Des Plaines, Ill. 8

STEAM CONDENSATE recovery system

DURING the process of separating propane, butane, and gasoline from crude gas at Texas Co.'s new Honor Rancho gasoline plant, near Castaic, Calif., one of the most important considerations is obtaining sufficient condensation of the lighter fractions removed from the oil in the still, which can only be accomplished by maintaining a relatively high condensation pressure. This means that either the still must be operated at a high pressure or uncondensed still vapors must be recompressed.

Texas Co. decided to operate the still at the relatively high pressure of 175 psig. Effective stripping of oil at this pressure is accomplished by the use of less than 0.25 lb. of steam per gallon of oil with the feed being heated to 515 deg. F.

Due to the hardness of the plant's water supply, steam is not generated in conventional boilers but by exchange with the hot oil from the still, which places steam condensate at a premium. Every effort is made to recover and reuse as much as possible of the steam condensate, which comes into the plant in the gas in a vapor state and is relatively pure.

Water from the still reflux accumulator, the still bootlegs, and the second stage fat oil vent tank is returned automatically through an oil-water separator to the steam generator feedwater heater. Even water which accumulates in the bottom of the absorber is not drained off but is permitted to carry on through to the vent tank. Normally the only water drained out of the system is a small amount of blow-down from the mud drum.

Gas from the second stage of compression is finally cooled in the water cooling tower and then passes through a scrubber where water and gasoline condensate are accumulated. Water is bled off automatically to a soft water storage tank. A small water softener was also installed but is not normally needed.

ALUMINUM FOR BRASS increases production

SUBSTITUTION of aluminum stock for brass in screw machine operations has reduced production cost for Don Wells Products, San Leandro, Calif. The change in stock was tested at the suggestion of Kaiser Aluminum and Chemical Corp.

The screw-machine-produced parts in the tests included a threaded blow-gun nozzle ¾ in. long and a knurled cap screw ⅜ in. in length. A major consideration and the only mechanical difference in aluminum and brass runs was tool angle. Tools used for the brass parts were ground with a zero degree back rake, whereas those for use on the aluminum parts were ground with an approximate back rake of 10 deg.

Comparative information based on lots of 10,000 pieces for both brass and aluminum stock indicated a savings of 33.7% in the case of the aluminum knurled parts, and the aluminum nozzles showed a 24.9% savings over the brass parts. Production time was the same in all tests, the cost reduction stemming from the increased parts per pound obtained from the aluminum screw machine stock.

30TH ANNIVERSARY

KRAFTILE Co., Niles, Calif., observed its 30th anniversary January 12 by honoring its first worker hired, Joseph Mesquite, a dry-pan operator. "Joe Mesquite day" was observed throughout the plant and a special luncheon held.

your extra dividend!
on every box and reel of...

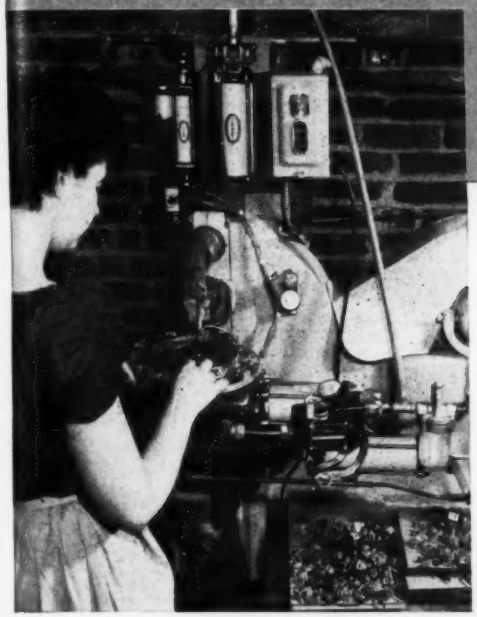
BRONCO Certified 60

We certify that the jacket of all cord or cable branded "Bronco 60 Neoprene Certified" contains not less than 65.46% of new Neoprene.
WESTERN INSULATED WIRE CO.
Registered Professional Engineer

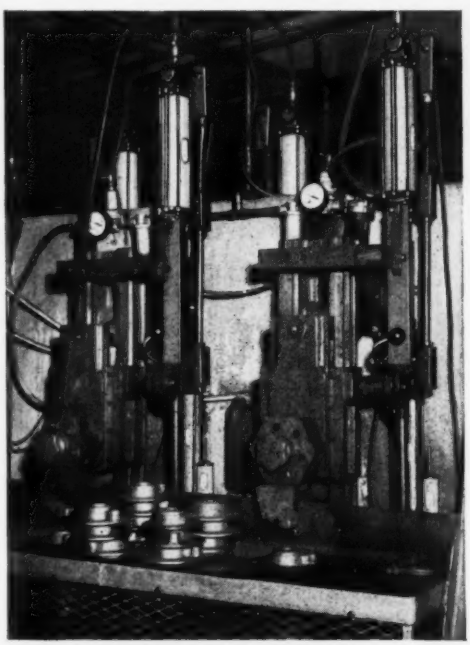
65.46% NEOPRENE!
This certification which appears on every box and reel of Bronco 60 Certified portable cable assures you that the protecting jacket contains *a bonus quantity of Neoprene...65.46%!* More Neoprene gives you greater oil-resistance, longer wear, more flexibility. You *know* what you are getting.
BRONCO 60 CERTIFIED
is sold only through
Electrical Wholesale Distributors.

Manufactured by
WESTERN INSULATED WIRE CO.
Los Angeles 58, California

WITH THIS UNIQUE AIR MOTOR

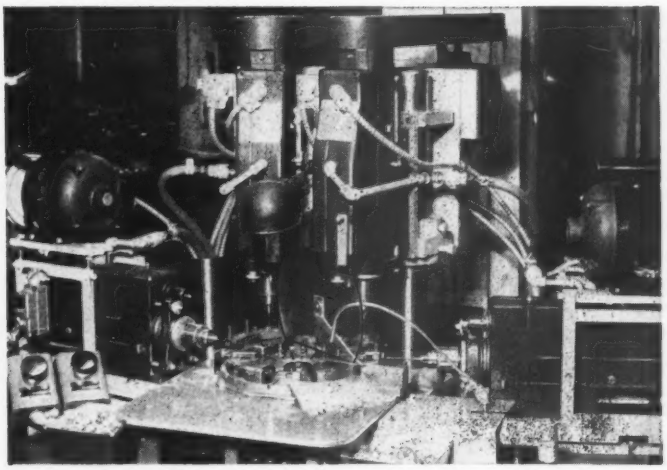


This semi-automatic set-up at Eastman Manufacturing Co. doubled production and eliminated fatigue in milling bakelite magneto parts.



A simple installation cut lathe time on steel ordnance parts from 90 to 10 seconds per piece at Joseph Pickard's Sons of Philadelphia.

you can build cost-cutting special machines or modernize existing machines right in your own shop with your own personnel



This drilling machine, built by Horrocks-Ibbotson, turned out 1 year's production of their fishing reel pawl blocks in 3 months.

Even for short runs you'll find special machines built around this versatile power unit will pay off in a big way — in greatly lowered costs, in fewer rejects, in better product quality. No expensive engineering is needed. In fact, your local Bellows Field Engineer may have in his Foto-Facts File basic designs that can be readily adapted to your product and your production processes.

Your own tool room can build such special machines at decidedly low cost, and quickly. Often they pay for themselves with the first week's savings.

Bulletin CL-50 tells the story of the Bellows Air Motor and the part it is playing in cutting manufacturing costs in hundreds of plants. Address: The Bellows Co., Dept. WI, 455, Akron 9, Ohio.

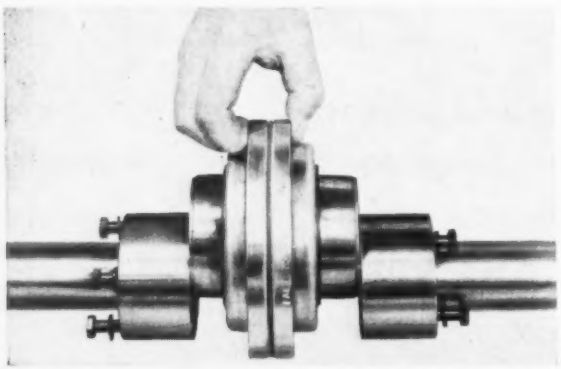
The Bellows Co.
OF CALIFORNIA
2001 S. GRAND AVE. LOS ANGELES 7, CALIF.

917-A

NEW EQUIPMENT AND MATERIALS

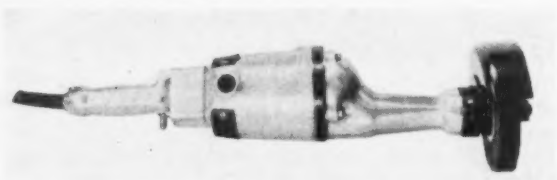
FOR YOUR CONVENIENCE the company address follows each item.

Spacer coupling for easy maintenance



New Type F Steelflex Spacer coupling is recommended by manufacturer for use between motors and pumps, where a gap between shafts must be provided to permit removal of pump impeller shaft assemblies, or on any application where a large gap (up to 12 in.) cannot be avoided. Coupling affords easy connection and disconnection of shafts without disassembling. Prelubricated at factory, maintenance lubrication of Spacer coupling requires addition of lubricant every six months by means of grease gun. *The Falk Corp., Dept. 361, 3001 W. Canal St., Milwaukee 8, Wisc.*

Portable grinder gets new motor

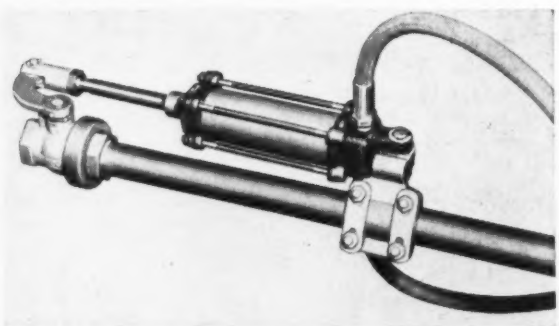


New motor gives this 6-in. portable grinder 85% more power than company's previous model, with a reduction in tool weight of 1½ lb. Lubricant-sealed ball-bearings insure continuous duty. Heat-treated helical gears give smoother transmission of power from motor to spindle. Strong air flow permits cool running and freedom from abrasive dust and carbon. Measures 24½ in. overall, weighs 18¼ lb. net, and has spindle speed of 3,750 rpm. *Black & Decker Manufacturing Co., Towson 4, Md.*

Low-cost lithographing

New pre-sensitized aluminum lithograph plate, said to cost half as much as others now on market and to save labor and equipment costs, will duplicate up to 5,000 copies of text or line drawings, or 2,500 copies of a halftone. New plate can be used on all popular models of offset duplicators and can be filed and re-run. Plate is prepared for use in only two steps when not more than 1,000 copies of linework or 500 copies of halftone are needed: (1) exposing, (2) desensitizing by wiping with a special fluid. Lacquering the plate, a third step, permits maximum number of copies. *A. B. Dick Co., 5700 W. Touhy Ave., Chicago*

Air-operated ball valve



This Rockwood ball valve is for remote control use and can be installed in elevated or remote locations and in danger areas. Control panel can be used for convenient operation of scattered valves. Valves come in sizes from ⅜ to 2 in. Kits are available to convert ordinary Rockwood ball valves to air operation. *Rockwood Sprinkler Co., 38 Harlow St., Worcester 5, Mass.*

This saw hogs into work

New design is offered in Milford hack saw and band saw blade line—a Hook Tooth band saw blade, for use in wood, plastics, and non-ferrous metals. Teeth, spaced two to six per inch, have a positive rake which hogs into the work, permitting very rapid rate of feed and exceptionally free cutting. Available in standard widths from ¼ to 1 in., 100, 250, and 500 ft. coils and cut-to-length welded bands. *Henry G. Thompson & Co., New Haven, Conn.*

RUBBER PRODUCTS for industry

Molding, Specialties, Solids, Roll Covering Pipe Lining, Tank Lining, Coatings, Custom Work

Send us your rubber problems

"If It's Rubber, We Can Make It"

Holz Tire & Rubber Co.

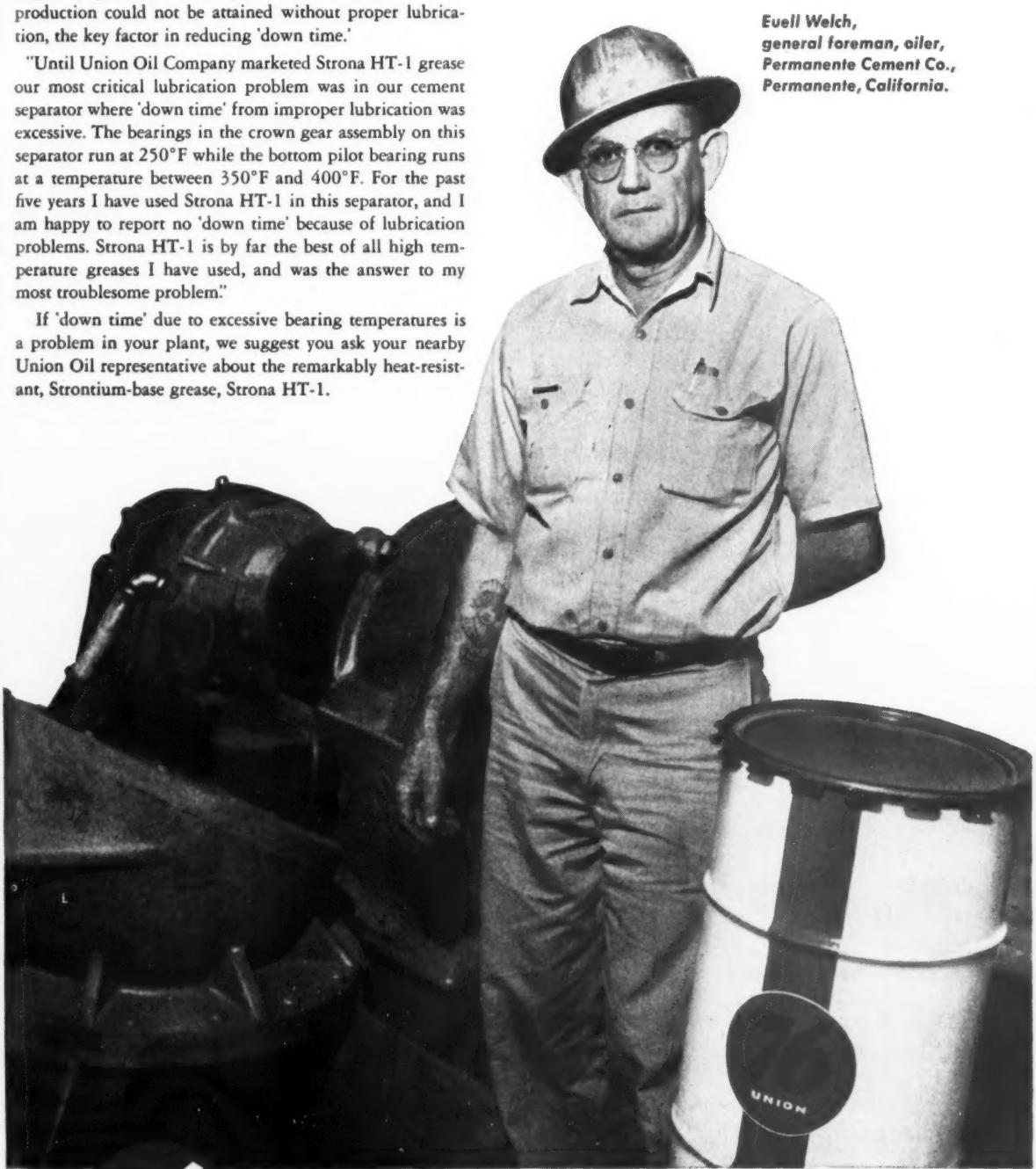
1129 S. Sacramento Street • Phone 9-4771 • Lodi, California

"Strona HT-1...best of all high temperature greases"

"Permanente Cement Company produces 17 types of cement totaling 7 million barrels per year, making it one of the largest single unit cement plants in the world. Yet, this production could not be attained without proper lubrication, the key factor in reducing 'down time.'

"Until Union Oil Company marketed Strona HT-1 grease our most critical lubrication problem was in our cement separator where 'down time' from improper lubrication was excessive. The bearings in the crown gear assembly on this separator run at 250°F while the bottom pilot bearing runs at a temperature between 350°F and 400°F. For the past five years I have used Strona HT-1 in this separator, and I am happy to report no 'down time' because of lubrication problems. Strona HT-1 is by far the best of all high temperature greases I have used, and was the answer to my most troublesome problem."

If 'down time' due to excessive bearing temperatures is a problem in your plant, we suggest you ask your nearby Union Oil representative about the remarkably heat-resistant, Strontium-base grease, Strona HT-1.



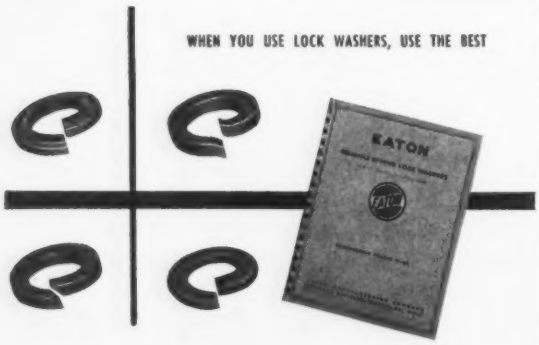
Evell Welch, general foreman, oiler, Permanente Cement Co., Permanente, California.

76

UNION OIL COMPANY
OF CALIFORNIA

Los Angeles: Union Oil Bldg. • **New York:** 45 Rockefeller Plaza • **Chicago:** 1612 Bankers Bldg. • **New Orleans:** 644 National Bank of Commerce Bldg. • **Atlanta:** 401 Atlanta National Bldg. • **Kansas City, Mo.:** 612 W. 47th St.

Designers and production men are well aware of forces constantly exerted in and around assembled parts. They are the reasons behind the universal acceptance of the nut, bolt and lock washer type of industrial fastening. A Reliance Spring Lock Washer has the reactive range and reactive pressure to keep tension in a bolted assembly long after wear, vibration and bolt elongation have destroyed the effectiveness of a less efficient type of fastening. That is why we say Reliance Spring Lock Washers keep bolted assemblies *tighter longer*. For complete information, write for engineering folder W-50. No obligation.



EATON MANUFACTURING COMPANY
RELIANCE DIVISION

604 Charles Avenue, Massillon, Ohio

Sales Offices: New York • Cleveland • Detroit
Chicago • St. Louis • San Francisco • Montreal

NEW EQUIPMENT

. . . Begins on page 7

New fluid control valves

New valves, especially designed for use in instrumentation, refineries, laboratory apparatus, air circuit work, vacuum systems, and pressure flow control, are offered by Imperial Brass Mfg. Co. Types include needle valves, toggle valves, Hi-Duty plug type valves, and packless diaphragm valves—all with forged brass bodies. For Catalog 3037 describing complete line, write *Imperial Brass Mfg. Co., 1200 W. Harrison Street, Chicago 7*

Combination woodworking tool

Combination power feed rip unit and 12-in. tilting arbor saw offers maximum efficiency, states manufacturer, on production ripping operations. Selective dial control on feed unit allows choice of a range of speeds from 20 to 90 ft. per min. Power feed units can be swung out of the way so that saw can be used individually. *Rockwell Manufacturing Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.*

Double-action carton clamp

Each arm of this Towmotor clamp is controlled by a separate hydraulic control lever, making fork lift truck high-stacking of heavy loads completely safe, according to manufacturer. Clamp arm pressure applied to both sides of carton can be equalized by lift truck driver to prevent tipping over high stacks of cartons. Increased storage capacity, reduced breakage and damage, and faster carrier turn-around are advantages claimed. *Towmotor Corp., 1226 E. 152nd St., Cleveland 10, Ohio*

Deep well jet pump

Major improvements have been made in 1955 Peerless deep well jet pump models, states manufacturer. These include new NEMA type motors, new shorter, threaded stainless steel motor shaft, new ceramic-plastic shaft seal, new method of mounting the pressure switch, and improved impeller design, as well as a patented method of piping connections for overall or offset installations. Longer life and quieter operation are claimed. Jet systems provide water capacities up to 3,600 gal. per hr. Motor sizes range from ¼ to 3 hp., 60 cycles, at 3,450 rpm. *Peerless Pump Division, Food Machinery and Chemical Corp., 301 W. Avenue 26, Los Angeles 31*

for many industrial filtering jobs

New Honan-Crane ...Full Flow Filters

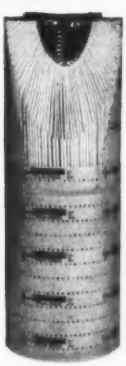
give you EXTRA HIGH Flow Rates —25 to 900 GPM!

plus

these time and money saving features

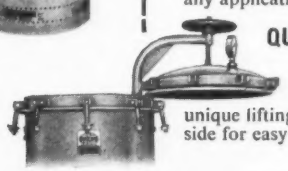
GREATER FILTERING EFFICIENCY . . . Designed for in-line installation. Every drop of oil or coolant in the system gets continuous filtration . . . solid particles down to micronic size (one micron = 0.00004 inch) are removed.

LARGE DIRT HOLDING CAPACITY . . . Uses remarkable new "Flo-Pac" Cartridge—a product of two years' research. Cartridge contains 44 square feet of filtering surface . . . has exceptionally long life.



RUGGED CONSTRUCTION . . . Built of heavy gauge steel for heavy-duty service with a minimum of upkeep. No moving parts. Special cover and cartridge gasket seals eliminate leakage and by-passing.

SIZES TO MEET ALL FLOW REQUIREMENTS . . . The Honan-Crane Full Flow Filter is available in nine compact models using one to 36 "Flo-Pac" Cartridges. Flow rates range from 25 to 900 GPM to provide "custom" filtration in any application, large or small.



QUICK OPENING COVERS . . . Covers are fastened by swing bolts which can be loosened in seconds. Larger models have unique lifting device that swings cover to one side for easy access to cartridges.

FULL FLOW SOLVES MANY FILTERING PROBLEMS

New Full Flow Filter can be used on lube and fuel oils, industrial cutting oils and coolants, solvents, washing solutions and similar liquids. Completely inert "Flo-Pac" cartridge will not remove additives or inhibitors. Ideal for water based solutions . . . will not soften or disintegrate in water.

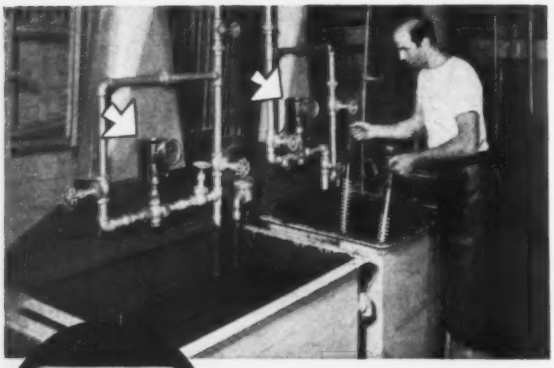
WRITE TODAY for colorful 8-page Equipment Bulletin 101 giving full details.

662 Wabash Ave.,
Lebanon, Ind.

SUBSIDIARY OF HOUDAILLE-HERSHEY CORP.

HOUDAILLE-HERSHEY OF INDIANA, INC.

FILTRATION DIVISION



POWERS
Temperature Regulator for Plating • Pickling Bonderizing Chromate Dips Cleaning • Rinsing

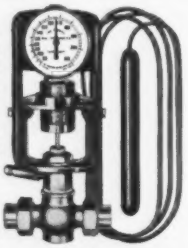
Saves LABOR and Steam Helps Eliminate Costly Rejects

POWERS No. 11-MF Regulator insures most effective use from various solutions by holding them at the right temperature automatically.

Plastic Thermal Bulb and Tubing is highly resistant to solutions used in above processes. Prevents electrical shorts. No insulators required for the regulator.

Easy to Read 4" Dial Thermometer indicates temperature of liquid being controlled and makes it easy to adjust regulator for different temperatures.

Bulletin 330 fully describes this simple, self-operating regulator. (b50)



THE POWERS REGULATOR CO., SKOKIE, ILL.
Offices in over 60 Cities, see your Phone Book • Established in 1891

This Fast-Setting, Corrosion-Proof Cement has the high strength and low absorption required in special equipment

LECITE

LECITE — furfuryl alcohol resin cement — is • inert to acids and alkalis • extremely dense • has tensile strength of 1,000 lbs. per sq. in.; compression strength of 10,000 lbs. per sq. in. • withstands temperatures up to 375° F. • will set completely at temperatures as low as 45° F.

LECITE serves as a corrosive-proof bonding agent • mortar for corrosion-proof brick lining • impervious membrane between brick or tile floors and concrete sub-base • in constructing acid-proof floors and chemical processing equipment • It is used in industries producing chemicals, dyes, synthetic resins, petroleum products, steel and copper — and many other products

Now available from local stocks, **LECITE IS ONE of a complete line of EL CHEM corrosion-proof materials of construction: cements, brick and tile, coatings, membranes, linings, etc. • EL CHEM'S complete service includes plans, engineering, materials and installation • Our on-the-spot representatives are backed by four decades of experience with every kind of corrosion problem • Surveys, recommendations, plans and estimates without obligation**

ELectro CHEMical ENGINEERING & MFG. CO., EMMAUS, PENNA.

PACIFIC COAST REPRESENTATIVES

J. W. GRANT, 385 East Green St.
PASADENA 1, Calif. SYcamore 2-2611

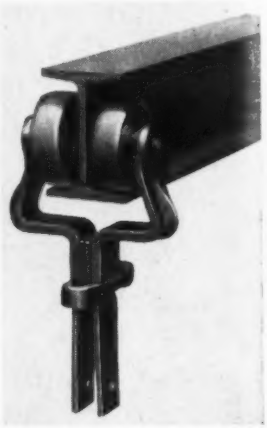
EAST BAY ENGINEERING CO.
3871 Piedmont Ave., OAKLAND 11, Calif.
HUmboldt 3-6777

NEW EQUIPMENT

. . . Begins on page 74

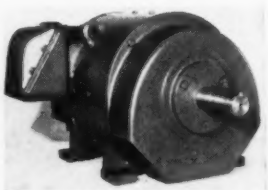
Easy-to-install, flexible trolley conveyor

Rapistan-Keystone 228 trolley conveyor is prefitted and match-marked at factory to speed up installation on the job without special crews. Systems can be made up to fit all operations from standard components: I-beam track, drive and take-up units, trolleys, and drive chain. All parts are accessible for lubrication, cleaning, and repair. Widely used, manufacturer states, for spray booths, ovens, bonderizing, and other processes inaccessible to workmen. *Rapistan-Keystone, Inc., 21750 West Eight Mile Rd., Detroit 19, Mich.*



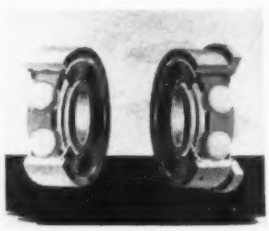
Super "T" motors

New Reliance Super "T" D-C motor accelerates to full speed in half the time formerly required, as result of lower mechanical inertia, lower electrical inertia, and higher commutating ability. Manufacturer states that this motor has fastest and most accurate response ever offered in a standard design motor. Now produced in sizes from 20 to 100 hp., range will be extended both upward and downward. *Reliance Electric and Engineering Co., 1088 Ivanhoe Rd., Cleveland 10, Ohio*



Added protection

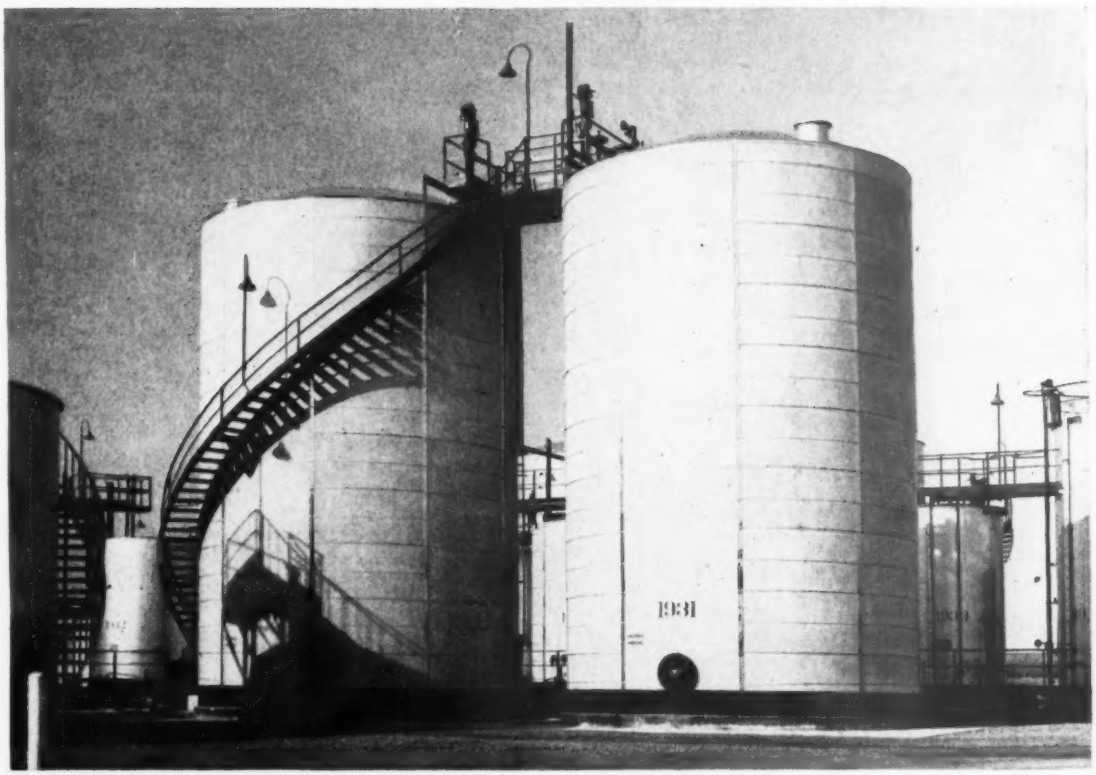
MICRO retainer radial bearings are now offered with single or double side shields for added protection against contamination during installation and use. Metallic type shields may be removed for cleaning bearing. Oil or grease lubrication; straight or flanged outer rings. Sizes range from 3/64 in. bore ½ in. overall diameter. Ask for print 1031 for complete details. *New Hampshire Ball Bearings, Inc., Peterborough, N.H.*



On-the-spot repairs for conveyor belts

REMA is a new repair material for conveyor belts and other rubber goods which vulcanizes automatically through a chemical agent, without application of heat and without any special equipment. A West German product imported by REMACO, Inc., sales agent in the United States is *Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44.*

if CORROSION is the problem . . . .



HORTON nickel clad tanks may be the answer

Whether you need nickel clad tanks, stainless clad or solid stainless . . . Chicago Bridge & Iron Company's expert design, fabrication and erection departments can help provide them. All four CB&I plants have facilities for stress-relieving, X-raying and pickling and painting fabricated materials by the Horton® phosphoric acid process.

The nickel clad tanks above are two of five we built for the Standard Oil Company of California's Richmond Refinery. They are 24 ft. in diameter by 36 ft. high.

When planning welded steel plate structures, corrosion-resistant or otherwise, write our nearest office for information, estimates or quotations.

CB&I

Chicago Bridge & Iron Company

Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston • Los Angeles • New York
Philadelphia • Pittsburgh • Salt Lake City • San Francisco • Seattle • Tulsa
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.

STEEL
Stanho
PRODUCTS
FLAT BOTTOM
WOODRUFF
KEYS
MACHINE
KEYS
TAPER
PINS
the Quality Line
of Precision Made Steel Products
KEYS—ALL TYPES • COTTER PINS
TAPER PINS • STRAIGHT PINS
MACHINE RACK • SPECIAL PARTS
KOOLHEAD Foundry Chill Nails
WRITE for
DESCRIPTION
and PRICES
STANDARD
HORSE NAIL CORP.
Since 1872
NEW BRIGHTON PA
M4
Western Factory Sales Representative
GRETHER & GRETHER, P. O. Box 47, Stockton, California

for
DEPENDABILITY
— the key
to successful
marketing
BLACKMER *rotary* Truck Pumps
- Self-adjusting for wear vane construction
- High mechanical efficiency
- Self-priming with high suction lift
- Heavy duty anti-friction bearings
- Cartridge type mechanical seals (TX models)

BLACKMER
liquid materials handling ®
BLACKMER
Industrial, Hand and Truck Pumps, Strainers, Pressure Control Valves
BLACKMER PUMP COMPANY, GRAND RAPIDS 9, MICH.
DIVISION SALES OFFICES — NEW YORK • ATLANTA • CHICAGO
GRAND RAPIDS • DALLAS • WASHINGTON • SAN FRANCISCO
See Yellow pages for your local sales representative

NEW EQUIPMENT

. . . Begins on page

Magnetic particle inspection

This portable SempuN magnetic flaw detector developed in England weighs 11 lb. and requires no electric current source to operate. Unit is a permanent magnet with ball joints and multi-self-adjusting magnetic pins, usable on any size part, which supplies DC type magnetic force for detecting sub-surface as well as surface flaws. Equipment is shown here in an inspection of crank shaft of a ship's auxiliary engine, which according to distributor, was accomplished in about 30 minutes. *Rice-Peterson Sales, Inc., Palo Alto, Calif.*

Self-greasing on fork trucks

Centralized lubrication systems are offered as accessories on this company's standard models of electric industrial trucks. System used on Automatic BF fork lifts has a small grease reservoir and injector mounted on the truck. System is kept charged by pushing injector plunger twice a day. System used on LF and LFS models has easily reached fittings at two points on each side of chassis, which service all trail axle and steering connection pressure fittings. *Automatic Transportation Co., 149 W. 87th St., Chicago 20*

New steel cutting grades

Two new steel cutting grades of cemented carbides, designated CA-608 and CA-610, are claimed to offer new standards of performance and high impact strength. For more information, write *Carmet Division of Allegheny Ludlum Steel Corp., Pittsburgh 22, Pa.*

Industrial puller

New heavy bar type puller provides up to 50 tons of power for pushing and pulling jobs. Rigidly built and specially heat treated, yoke is machined from 2½ in. square stock and is 16 in. long. Side rods are threaded at both ends. Two short extension rods, 9 in. long, and two long extension rods, 18 in. long, are included in set. *Snap-on Tools Corp., Kenosha, Wis.*

Crane adds plastic pipe and fittings

Polyethylene plastic pipe and modified polystyrene insert fittings for industrial, plumbing, and farm use are now manufactured by this company in accordance with commercial standards CS 197-54, U. S. Department of Commerce. Initial production of plastic pipe is available from ½ to 2 in. in size and in standard coil lengths. *Crane Co., 836 S. Michigan Ave., Chicago 5*

When the problem is silver brazing AIRCOSIL is your answer!

As a result of long research — and utilizing its many years of experience in all phases of metal working — Airco has developed a complete new line of silver brazing alloys, produced to Airco's own high quality standards. These are AIRCOSIL Silver Brazing Alloys and AIRCOSIL Silver Brazing Flux — two fine products "made for each other" to give you the best in silver brazing.

You'll find that the characteristics of AIRCOSIL alloys and flux are equal or superior to that of any competitive products. AIRCOSIL alloys and AIRCOSIL flux embody all the properties that assure consistently economical production and quality results.

Another innovation is that AIRCOSIL is available in avoirdupois weight — 16 ounces to the pound! Because industrial business everywhere is based on avoirdupois measures, this will save you complicated conversion time.

Airco, as a leader in the field of joining metals, has prepared a 24 page booklet which discusses AIRCOSIL in complete detail. If time and quality mean money to you, we advise that you contact your Authorized Airco Dealer or write Airco direct for your free copy.

VISIT AWS WELDING SHOW . . . BOOTH 254

AIRCO®

AIR REDUCTION PACIFIC COMPANY

SAN FRANCISCO • LOS ANGELES • PORTLAND • SEATTLE
San Diego · Bakersfield · Fresno · Emeryville · Sacramento · Tacoma

Western Headquarters for Oxygen, Acetylene and Other Gases . . . Carbide . . . Gas Welding and Cutting Machines, Apparatus and Supplies . . . Arc Welders, Electrodes and Accessories

Air Reduction Pacific Company is a division of Air Reduction Company, Incorporated. Principal products of other divisions include: PURECO — carbon dioxide, liquid-solid ("DRY-ICE") • OHIO — medical gases and hospital equipment • NATIONAL CARBIDE — pipeline acetylene and calcium carbide • AIRCO — acetylenic chemicals • COLTON — polyvinyl acetates, alcohols and other synthetic resins.

RUGGEDNESS in Motion

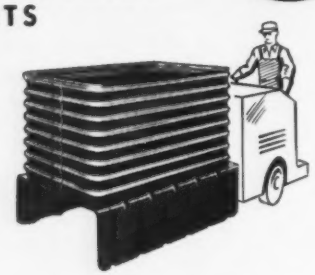
MATERIAL HANDLING with STEEL BOXES, SKIDS and PALLETS

REPUBLIC STEEL

STEEL BOXES
Dump box type, roll-over, fork-truck type, tiering type and special purpose units.

STEEL SKIDS
4" to 18" high in wide range of sizes.

STEEL PALLETS
Single-face, semi-double face and double-face types available in many sizes.



Designed to speed up movement and cut down costs in the handling of materials in this competitive, fast-moving era — these Republic steel boxes, skids and pallets are meeting industry's needs everywhere. Precision-fabricated from strong, corrugated steel sheets, these practical, flexible items can be used in combination with power lift trucks, cranes or hand-operated units.

OTHER PRODUCTS FOR INDUSTRY

Steel shelving, shop desks, tool room equipment, lockers, office desks, bar racks, files and tables.

PETLEY INCORPORATED
INDUSTRIAL AND AUTOMOTIVE EQUIPMENT ENGINEERS

899-73rd Ave., Oakland 21, Calif.
Telephone: TRinidad 2-7621

Representatives:
REPUBLIC STEEL CORPORATION
(Pressed Steel Division)
5424 E. Slauson Ave., Los Angeles 22, Calif.
Telephone: RAymond 3-3327

STOP THAT FALLING LOAD

So that loads cannot be bounced from skid or pallet while in motion, ELPAR engineers have perfected a New Hydraulic Load Stabilizer. This valuable device protects the load and operator. It can be supplied on any ELPAR fork truck with hydraulic lift. Stabilizer consists of a large protective pad that clamps firmly on top of load.

Write for Complete Information

ELWELL-PARKER ELECTRIC CO. WESTERN REPRESENTATIVES:
Los Angeles . . . J. W. LAFFERTY CO., 5422 E. Washington Boulevard
San Francisco . . . . . IRA G. PERIN CO., 575 Howard Street
Seattle . . . . . COLBY STEEL & MFG. INC., 3155 Elliott Avenue

NEW EQUIPMENT

. . . Begins on page 74

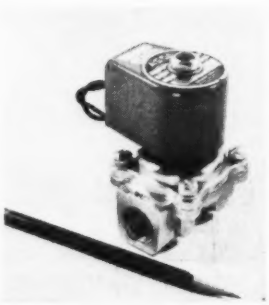
Skin-diver

New submersible sump pump, which handles up to 3,250 gal. per hour, will operate in water up to 15 ft. in depth. The 1/3 hp. motor and switch are completely enclosed and sealed in a stainless steel housing. Motor housing is the float. with no outside floats or rods. No lubrication is required. *Carver Pump Co., Muscatine, Iowa*

New portable electric saws

Skil Corp. has added three new heavy duty portable electric power saws to its 1955 line: a 6½-in. Model 864; a 7¼-in. Model 874; and an 8¼-in. Model 884. More powerful motors, lightweight and balanced design for easy handling, high blade speed, and fast cutting in any position are the advantages claimed. *Skil Corp., 5033 Elston Avenue, Chicago*

For low-pressure air and gas control



New direct lift, solenoid-operated, packless valve for low pressure applications up to 7 psi. is available in ⅜ and ½ in. pipe sizes. Designated 8030A, this new valve has a stainless steel core and composition disc housed in a heavy duty, forged brass body. Recommended by manufacturer for low pressure air and gas control on gas fired ovens and furnaces, automatic dispensing units, vacuum holding ap- *Automatic Switch Co., Orange, N. J.*

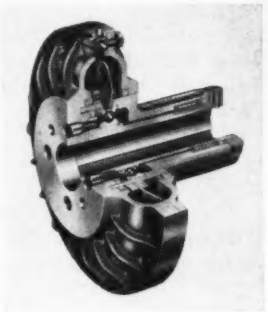
SULPHURIC ACID
for the west
66° BAUME 20%
98% OLEUM
and special grades

Garfield CHEMICAL & MFG. CORP.
ESTABLISHED 1916
700 PACIFIC NAT'L BLDG.
SALT LAKE CITY, UTAH

For packing packages

Adjusta-Pak container is assembled from eight modular units of slotted and scored fiberboard sheets. All are identical and interchangeable. They telescope, allowing sections to conform to the inner containers. Entire unit is unitized with three or more bands of tensional steel strapping. Use of inner packing materials is reduced to a minimum, as is cubic volume of a shipment. Stock sections will reportedly contain shipments ranging in size from 18x18x7 in. up to 38x28x24 in. Other sizes designed to requirements. *Signode Steel Strapping Co., 2600 N. Western Ave., Chicago 47*

Dry fluid drive



Flexidyne is reported to be a new development in industrial power transmission —originated in Europe and now redesigned to American standards. Major advantages claimed over other fluid types is that at normal operating speeds, it does not slip, whereas in case of overload, slippage will give protection. Flexidyne drive has a "flow charge" between rotor and housing which is made up of fine particles of spherical steel shot, in action much like a fluid. Amount of flow charge determines torque capacity, and because it is easily varied, drive will give exact starting torque needed. Recommended for industrial drives on equipment such as compressors, centrifuges, conveyors, crushers. *Dodge Manufacturing Corp., Mishawaka, Ind.*

Nylon-reinforced hose

New oil discharge hose reinforced with nylon cord is said to be 60% lighter weight than conventional hose for this service. Called Type 950, hose is recommended for loading oil and gasoline in refineries and terminals and in dock and ship service. Unlike wire-reinforced hose, nylon cord construction is said to eliminate fatigue flexing, as well as hose "flutter." Type 950 is available in six sizes, from 3 to 12 in., built for working pressures up to 150 psi. *B. F. Goodrich Co., 5400 E. Olympic Blvd., Los Angeles 22*

Industrial and Protective Coatings

that wear better!

Especially formulated to protect metal, wood, concrete—submerged or not; acid and alkali resistant. Colors available. *Full free details, write for:* Folder 575, Dept. 8.

An Inertol Product

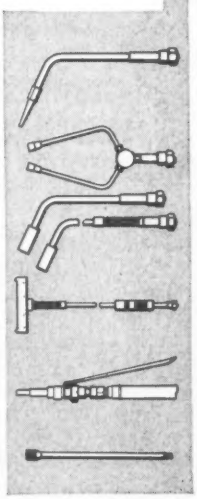
INERTOL CO., Inc.

27 So. Park, San Francisco 7

* Buy Victor and get Torch Versatility

Cutting with VICTOR Model 300 Series Torch Butt and Model 2450 Cutting Attachment; cuts to approximately 8"

The versatility of VICTOR torches means you can buy exactly what you need for today's job, then add other nozzles, tips and attachments as required. Your equipment grows with your needs; stays custom-fit to your work. For example, here are a few of the 34 standard attachments for VICTOR 300 Series Torch Butts.



Welding . . .
Here's one of 10 standard single-tip nozzles available for general welding and preheating.

Heating, Brazing . . .
You have your choice of 11 standard multiple-tip or multi-flame nozzles for preheating, brazing, silver soldering, etc.

Descaling, Flame Priming . . .
Save time and money with VICTOR attachments that fit your exact needs.

Automatic Gas Saver . . .
Shuts off welding gas, keeps pilot light on, saves as much as 75% of total gas consumption.

Nozzle Extensions . . .
Let you handle hard-to-reach jobs, keep you

Start *right*. Buy the versatile VICTOR torch that grows with your job. See it at your VICTOR dealers *today* . . . or write NOW for Catalog 20.

16

VICTOR EQUIPMENT COMPANY

VICTOR for welding

Mfrs. of welding & cutting equipment; hardfacing rods; blasting nozzles.

844 Folsom Street
SAN FRANCISCO 7

3821 Santa Fe Ave.
LOS ANGELES 58

THE MORE KNOW-HOW YOU PUT IN THE BARREL, THE MORE PROFIT YOU TAKE OUT

Useful facts gathered during Oakite's years of experience in barrel finishing are packed in this 10-page booklet covering such subjects as:

PRECLEANING
CUTTING DOWN, DEBURRING
PICKLING, DESCALING, BRIGHT DIPPING
BURNISHING

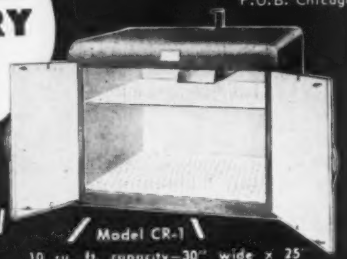
FREE For your copy of the Oakite Barrel Finishing booklet, write to Oakite Products, Inc., 1001 E. First St., Los Angeles, or 681 Market St., San Francisco, Calif.

Technical Service Representatives in Principal Cities of U. S. and Canada

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

ELECTRIC OVEN • Only $89.50 F.O.B. Chicago

GRIEVE-HENDRY PORTABLE ELECTRIC OVEN



FOR PRODUCTION OR LABORATORY USE

Model CR-1
10 cu. ft. capacity—30" wide x 25" deep x 24" high. Removable shelves and drip pan.

Quick Quotations—Prompt Delivery—Reasonable Prices—on Ovens made to your requirements.

Portable. Adjustable temperature control to 225°F. Fan driven forced air circulation. Uniform temperature throughout. Plugs into any 110V wall outlet—no special wiring required. Can be used in a group or bank.

Other standard models with temperature ranges to 1000°F available.
Write for literature.

GRIEVE-HENDRY CO., INC.
1423 W. Carroll Ave., Chicago 7, Ill.
Sales Engineers in San Francisco, Los Angeles and Portland

NEW EQUIPMENT

. . . Begins on page 74

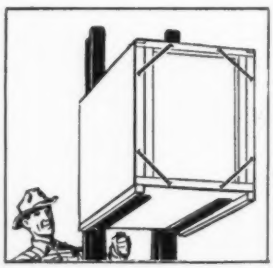
Scoop on fork trucks

Hydraulic dump bucket scoop attachment is designed for operations that require accurate measuring and batch weighing, such as chemicals, sand, coal. It can be interchanged with standard forks on any SpaceMaster electric fork truck, and is shown here on a 2000-lb. capacity Model J, picking up load of sand. Capacity is either 5 or 10 cu. ft. Double-acting hydraulic cylinder allows controlled dumping. *Lewis-Shepard, Watertown, Mass.*

Dings metal detector

New Dings "Universal Series" metal detector, sensitive to all magnetic metals, is built for general industrial service as well as mining applications, where deep burdens may be encountered. Simple in design and operation, compact control cabinet weighs only 24 lb. and contains standard type tubes. To operate, unit is plugged into any single phase outlet, search coil is placed around conveyor belt, and switch is turned on. *Dings Electronics, Inc., 4740 W. Electric Ave., Milwaukee 46, Wisc.*

Shipping crates with no nails

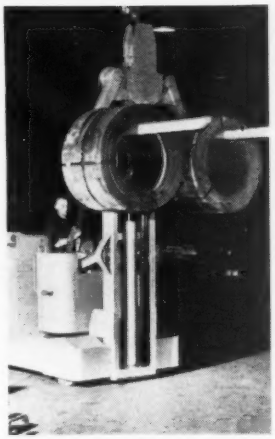


New patented shipping crate incorporates diagonal bracing in assembly, with a corner-locking device that locks by a single twist. Advantages are said to be low assembly cost, better product protection, easy inspection in transit, pallet feature built into container which eliminates need for expensive skids and dunnage. Recommended for shipping appliances and electronic equipment, as well as for use as tote bins, storage, pallet frames, and other materials handling processes. *Evans Container Corp. of Los Angeles, 5832 E. 61st St., Los Angeles 22*

Torcon torque converters

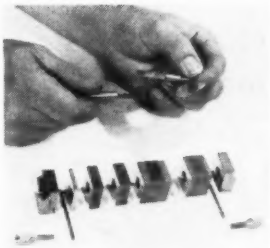
Complete line of torque converters for use in heavy duty off-the-road vehicles, as well as stationary power plants, offers rated capacities from 30 to 600 hp. and is available in 11 through 19 in. and 26 in. wheels. Accessories included with unit are a pump, cooler, and pressure regulator. Optional "free wheel" mounting for stator or reaction member, manufacturer claims, gives combined advantages of torque converter and fluid coupling, and is recommended for equipment operating at low load and high speed for a large part of its work cycle. Case for torque converter package is built with standard bolt circles, and it is easy to add accessory units to build up desired type of system. *Clark Equipment Co., Automotive Division, Falahee Rd., Jackson, Mich.*

Split ram attachment



Special hydraulic split ram is available for use on 15,000-lb. capacity industrial truck. Ram can be used as a single unit or as a pair of forks for handling one large coil or two smaller coils or packs of sheet. Suitable for either electric or gas-electric trucks, tilt or non-tilt, telescoping or non-telescoping. Length of ram and height of lift can be altered to suit individual requirements. *Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio*

On the square



DoAll Co. offers square gage blocks and a new system of assembling them, latest step in company's gage manufacturing program. Picture shows assembly of an inside caliper gage. Vee block arrangement holds pins, and milled ratchet teeth on tie rods (in hands) allow quick adjustment of length. New system of accessories, which can be used with all standard square blocks, permits assembly of a variety of gages tailored to requirements. *DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.*

Movable conveyor spur

Trav-A-Spur travels on rails mounted on each side of a live roller conveyor and has its discharge end mounted on caster wheels that run on the floor. It can be shifted from one station to another, states manufacturer, in short order, and is then held rigidly in place by a single lever-action cam clamp. Suggested applications are in warehousing, assembly, inspection, and packaging. Available in standard widths of 11½, 15, 18, and 24 in., with length and height to suit requirements. *Metzgar Conveyor Co., 402 Douglas St. N.W., Grand Rapids 4, Mich.*

All-weather cab by Mercury

All-steel 12-gage cab body is supplied with Mercury "Banty" Model A-460 gasoline tractor, or can be purchased separately for mounting on tractors now in use. Cab has half-doors, canvas roll-down curtains, and hot water heater for operator comfort. One-piece, shatterproof glass windshield has electric windshield wiper and defroster system. *Mercury Manufacturing Co., 4044 S. Halsted St., Chicago, Ill.*

Randall

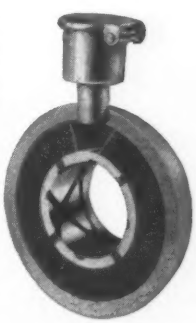
PILLOW BLOCKS

the only Pillow Block with all these outstanding features!

DOUBLE LUBRICATION
QUIET OPERATION
SELF-ALIGNING
LOW COST

Randall offers the most complete line of high quality Graphited Sleeve Bearing Pillow Blocks to be found anywhere. They are available in many different styles and sizes for light, normal, and heavy duty applications on shafts from ½" to 3 15/16" inclusive. They have a reputation for giving long, quiet, trouble-free service with the minimum of maintenance. See this complete line of competitively priced pillow blocks at your local distributors, today.

The exclusive Randall Ball Assembly, here illustrated, is in its several different styles, a basic part of every Randall Pillow Block. It is made of a precisioned hollow ball packed with No. F-11 wool felt. When the graphited bronze bushing is pressed into the ball, a large "deep well" oil reservoir is formed. Oil from this reservoir is fed to all parts of the bearing surface by porous graphite plugs and grooves in the bearing. Thus proper lubrication is assured under extreme operating conditions. Randall Ball Assemblies are readily adapted to a variety of different housings and may be purchased separately for individual designs.



Additional information on Randall's complete line of Pillow Blocks and Ball Assemblies is yours upon request.

BRONZE BAR STOCK
BRONZE BUSHINGS
PILLOW BLOCKS
SHEET LUBRICATOR
GRAPHITED BEARINGS
THRUST WASHERS
SAFETY COLLARS
BRONZE CASTING

Randall

RANDALL GRAPHITE BEARINGS, INC.

1011 S. Greenlawn Ave., Lima, Ohio

HELPFUL LITERATURE

FOR YOUR CONVENIENCE the company address follows each item.

Word to the wise

Check list for exhibitors at any industrial show, prepared by a company that makes a business of planning and setting up booths, has tips that range from how to bring visitors into the booth through how to provide for your own comfort. Suggestions are down-to-earth and show respect for the budget. *Floats, Inc., 2107 Chico Ave., El Monte, Calif.*

Play it safe

This 20-page booklet, designed for employee distribution, offers safety hints, rules, and checklists for off-the-job, in and around the plant, and on-the-job activities. "Let's play it safe" presents a broad coverage of safety and accident prevention useful in any line of work and in the home. Available from *Johns-Manville Corp., 22 E. 40th St., New York.*

The Lever

Lewis-Shepard quarterly magazine features applications of both hand and electric trucks in grocery warehousing, cold storage warehousing, motor freight, bottling, textiles, drum handling, and paper handling industries. This 16-page periodical also includes announcement of two new trucks and photographs of other materials handling vehicles. Write to *Lewis-Shepardard Products, Inc., Department R-7, Watertown, Mass.*

Adjustable shelving

A 4-page folder shows both open and closed type Hallowell shelving and claims savings of up to 33% in assembly time. Multiple piercing and forming of all shelving parts account for greater accuracy and assure easier assembly and complete interchangeability. *Hallowell Division, Standard Pressed Steel Co., Jenkintown, Pa.*

Designed for cooling towers

Cutaway drawing and well-organized text present features of Lufkin Type VB spiral bevel gear reducer, built for cooling tower fan duty (said to be one of the most severe tests to which a gear reducer can be put). Last page of this 4-page folder lists manufacturers using Lufkin VB reducers in building induced draft cooling towers or aerial dry fan coolers, as well as typical installations throughout the country in a number of different industries. *Lufkin Foundry & Machine Co., Lufkin, Tex.*

Reinforced plastic tooling

This manual describes the fabrication and indicates the uses of such plastic tools as spotting racks, checking and inspection fixtures, welding and assembly fixtures, duplicate die models, drill and trimming fixtures, and matrices made from thermosetting resins—phenolics, polyesters, and epoxies—strengthened with glass fibers. The 20-page handbook, based on actual step-by-step operations in tool and die shops engaged in reinforced plastic tooling, is illustrated with photographs, drawings, and diagrams. *Marblette Corp., 37-21 30th St., Long Island City 1, N. Y.*

Hystaways in action

Attractive illustrated bulletin (1235) explains in 20 pages the versatile services of Hyster Hystaway excavator-crane, mounted on new or used Caterpillar D6, D7, or D8 track-type tractors. Equipment is shown for use in pipeline trenching, open pit mining, sewer jobs, irrigation ditches, erecting transmission poles, loading logs, pile driving, railway maintenance. Available from Caterpillar-Hyster dealers or from *Hyster Co., 2902 N. E. Clackamas, Portland 8, Ore.*

Power industrial trucks

Here is an eight-page condensed catalog covering Elwell-Parker line of fork trucks, high and low-lift platform trucks, and crane trucks. Each type is detailed in a separate section with photographs of individual models, operating and design information, and complete specifications. In addition, pictures and data are given on specially designed vehicles for special handling problems and over a dozen attachments to increase flexibility of industrial trucks. *Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio*

Welding profits

"More Profits from Welding" (TIS 2328) is new 4-page folder explaining Eutectic metal working materials and processes. Illustrated spread, pages two and three of the folder, is available in shop or window poster form headed "Welding Wanted." *Eutectic Welding Alloys Corp., 40-40 172 St., Flushing, New York, N. Y.*

Metered lubrication

New eight-page bulletin (16) presents Farval Multival system of centralized lubrication. Diagrams and photographs point up its operating features and advantages. Two pages of material guide a prospective user in planning a space-saving Multival installation on his own equipment. *Farval Corp., 3249 E. 80th St., Cleveland 4, Ohio*

Fan selection data

This 24-page bulletin (DS-348U) enumerates advantages, construction features, and specific types of applications of a new line of belt-driven and direct-drive centrifugal fans. For your copy write *The Trane Co., La Crosse, Wisc.*

IRA G. PERIN CO.

Material Handling Equipment

LOCAL STOCK & PARTS

SAN FRANCISCO 5
575 Howard Street
Phone GArfield 1-1827

SERVICE • • • SURVEYS

61,167 gauges...to deliver your Crane Valves 100% quality inspected

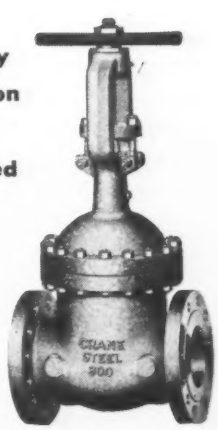
Care-how! A newly coined catch-phrase? Not at Crane! It is a rigidly-adhered-to principle of quality control—100 years old!

By way of example, the Crane technician in the photograph is checking the taper, size and guide slot alignment on gate valve discs. Every disc must correspond to the setting of the indicators—to tolerances of .001 inch plus or minus, on the taper, and .008 inch on the alignment of the slot guides. And Crane uses 61,167 gauges to insure dimensional accuracy.

Why this Care-how? To assure you of smoother, longer lasting valve operation, with lower maintenance and repair costs.

There you have the reasons why knowing and thrifty buyers prefer Crane valves . . . why industry uses more Crane valves than any other make! And the reasons why you should always buy Crane. Crane Co., General Offices, 836 S. Michigan Ave., Chicago 5, Illinois. Branches and Wholesalers serving all industrial areas.

Better Quality
Bigger Selection
in Valves
for Every Need



CRANE CO.

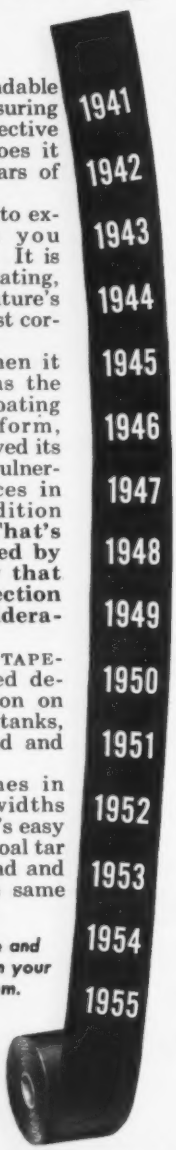
VALVES • FITTINGS • PIPE
KITCHENS • PLUMBING • HEATING

CRANE'S FIRST CENTURY...1855-1955

Is the Protection You Buy TIME-TESTED Like

TAPECOAT

...the Quality Coal Tar Coating



There is one dependable yardstick for measuring the quality of protective material: How does it stand up over years of service?

You don't have to experiment when you specify TAPECOAT. It is quality coal tar coating, and coal tar is nature's own defense against corrosion.

Since 1941, when it was introduced as the first protective coating in handy tape form, TAPECOAT has proved its ability to keep vulnerable steel surfaces in "like new" condition year after year. **That's why it is specified by those who know that continuing protection is the first consideration.**

For 14 years, TAPECOAT has provided dependable protection on pipe, pipe joints, tanks, etc., above ground and under ground.

TAPECOAT comes in handy rolls in widths from 2" to 24". It's easy to apply and the coal tar provides both bond and protection at the same time.

Write for brochure and recommendations on your corrosion problem.

The TAPECOAT Company

Originators of Coal Tar Tape Protection

1563 Lyons Street · Evanston, Illinois

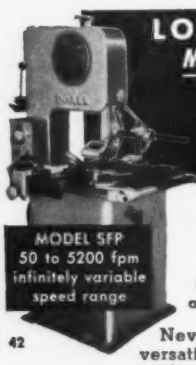
HELPFUL LITERATURE

New G-E load center line

Two-color 12-page booklet (GEC-1309) introduces and gives the details on new load centers, circuit breakers, and accessories for residential and light commercial service entrance installations. In addition, it provides data on ratings, specifications, wiring diagrams, and dimensions for load centers, and merchandising aids available for contractors. *General Electric, Trumbull Components Department, Plainville, Conn.*

How to pick refractories

New 20-page bulletin entitled "Boiler Refractories" (R-36) discusses importance of selecting proper refractory materials and basic requirements they must meet to avoid causes of failure such as spalling, shelling, high hot loads, erosion, shrinkage, and expansion. Typical uses of firebrick, castables, plastics, and mortars are described and pictured. Special section is devoted to ashpit refractories. *Refractories Division, Babcock & Wilcox Co., 161 E. 42nd St., New York*



Never before such versatility at this price — widest range of attachments available to do unlimited band machining jobs. 5 models — fixed and variable speeds. Same quality as the big DoALL's. Ask for Catalog and free Demonstrations. Call your local DoALL Service Store, or write.

DoALL The DoALL Company
Des Plaines, Illinois

Business machine supplies

Answers to many questions from buyers and users of business machines are offered in a new 6-page booklet (RSR-291) with an insert sheet (RSR-296) which delves into the proper selection and performance of carbon paper ribbons and special formula fabric ribbons for photographic processes and offset reproductions. Booklet is available from *Remington Rand Inc., 315 Fourth Ave., New York 10, N. Y.*

Coating, printing, and embossing

This bulletin describes the Waldron Multi-Coater, a newly developed coating, printing, and embossing unit, which will handle seven different light-duty coating processes and function as a gravure printer. The 2-page Waldron Multi-Coater Bulletin 1018 may be obtained from *John Waldron Corp., Box 791, New Brunswick, N. J.*

Stainless steel pipe fittings

New150-lb. stainless steel pipe fittings available for a wide variety of requirements in ⅛ in. to 2 in. sizes in both screw-end and socket welding types are described with full dimensional specifications in a new bulletin, S-3-55. Write to *Watson-Stillman Fittings Division, H. K. Porter Co., Box 95, Roselle, N. J.*

Industrial hose and fittings

A 132-page catalog of information for designers of hydraulic and pneumatic control systems on a line of industrial hose and fittings is offered by The Weatherhead Co. The "Yellow Book" is tabbed for quick reference and includes technical data and service tools and equipment sections. *The Weatherhead Co., 300 E. 131st St., Cleveland, Ohio*

Diesel engine data

New brochure presents construction details, applications, and latest design features on this company's diesel engines, with a 3-page schematic illustration of component parts and specifications (S-500-B42B). *Worthington Corp., Harrington, N. J.*

Viking Pump's latest

This 16-page loose-leaf catalog of the complete line of Viking rotary pumps presents photos, diagrams, and specifications of pumps for all applications. An engineering section contains performance graphs based on pumps operated under 5-in. mercury vacuum. *Viking Pump Co., Cedar Falls, Ia.*

you can be one of the lucky weldors to get a

"GOLD ROD"

. . . share $300 in awards

COMMEMORATING EUTECTIC'S 15TH YEAR OF "GOLDEN" SAVINGS FOR AMERICAN INDUSTRY AND FIRST 50 YEARS OF RESEARCH

There's no contest to enter! Nothing to write! Between April 1st and November 1st, 1955, five weldors will find a special "Gold" rod or electrode in their shipments of new, 1955 Eutectic "Low Temperature Welding Alloys." One represents the 1 billionth "rod" produced by Eutectic during its first fifteen years. The weldor who returns it to his Eutectic District Engineer will receive a $100 award.

The four other "Gold" rods symbolize Eutectic's 15th Anniversary and first 50 years of research. The weldors who return these will each receive a $50 award.

It's as simple as that. Just be on the watch for a "Gold" rod in your shipments of EutecRods and EutecTrodes.

MAKING WELDING EASIER AND MORE PROFITABLE THROUGH RESEARCH

15 years of relentless research have helped Eutectic "Low Temperature Welding Alloys" gain the preference of a rapidly increasing number of weldors in 87,000 American industries. Each year, Eutectic research has introduced new products for "Better, Faster, Cheaper" welding. Now, a new "15th Anniversary" laboratory in Flushing, N. Y., and additional research centers in Europe will assure continued advances in the fight against an important cause of weld failure: HIGH HEAT!

To keep pace with the increasing demand for Eutectic "Low Temperature Welding Alloys," a 1,000-rod-per-minute extrusion press and baking oven has been installed in Eutectic's Flushing plant. As on all five Eutectic production lines, the speed of this equipment is secondary to its ability to meet the rigid quality controls that maintain every Eutectic product at the most exacting specifications.

EUTECTIC DISTRICT ENGINEERS PROVIDE UNIQUE "SHOP-TO-SHOP" SERVICE

The more than 350 District Engineers show . . . so weldors can know . . . how to get every advantage of "Low Heat Input" metal joining. On every call, the Eutectic District Engineer brings in his "kit" the full resources of Eutectic research, new alloy developments, and the vast experience that he and all his fellow District Engineers have amassed over the years.

One of the many products introduced by Eutectic District Engineers during 1954 was EutecTrode 1850 — the all-purpose, highest tensile copper alloy for joining and overlaying dissimilar metals. During 1955, they'll introduce other and equally superior new "Low Temp" EutecRods and "Low Amp" EutecTrodes. Watch for these new sources of savings.

50th YEAR OF WELDGINEERING

J. P. H. Wasserman first saw the phenomenon of surface alloying and adapted it into a new welding process in 1905. Rene D. Wasserman perfected the process, and, in 1940, founded Eutectic Welding Alloys Corporation, in New York. Eutectic is now the inventor, patentee and sole manufacturer of Eutectic "Low Temperature Welding Alloys"® that minimize or completely eliminate the dangers of high heat fusion welding — warping, distortion, stress and embrittlement of base metals. Today, after 50 years of pioneering and Weldgineering, Eutectic is your guarantee of a profitable solution for most welding problems . . . your one source of "Low Heat Input" metal joining techniques.

J. P. H. Wasserman

R. D. Wasserman

FREE 15th ANNIVERSARY DIRECTOROD GUIDE

There is no substitute for Eutectic "Low Temperature Welding Alloys" . . . no "produced-for-a-price" welding material can ever provide Eutectic results. To help you select the EutecRod or EutecTrode that will give you the largest savings per job, write today for your free copy of the new, 32-page 15th Anniversary Directo-Rod Guide to "Better, Faster, Cheaper Welding." *Just ask for TIS 1340.*

EUTECTIC WELDING ALLOYS CORP.

172nd Street and Northern Boulevard, Flushing 58, N. Y.

WORLD-WIDE WELDGINEERING TEAM

With Associated Laboratories in

Lausanne, Switzerland
London, England

Low Temperature EUTECTIC WELDING ALLOYS

Paris, France
Frankfort, Germany

18
KINDS
OF BANDS
DoALL
SAW BANDS
In Exclusive
"Strip-Out"
METAL BOX
A steel tape with teeth on it which feed continuously forward into the work. It is the world's fastest method of removing metal—or *any* solid substance!

THE DoALL COMPANY
Des Plaines, Illinois

DoALL

ORDER FROM YOUR LOCAL DoALL STORE
SB—22 Consult Phone Directory

Here's how we

SAVE ON RAILS

BUY "GUARANTEED RELAYERS"

Handle more cars better — spend less to install and maintain with Relayers from Foster. "Open-stock" shipments from Foster warehouses, all sections 12# thru 175# — plus Switch Materials and Track Equipment items.

Send catalogs ☐ *Rails* ☐ *Track Equipment*
☐ *Send Free 'Track Maintenance' Book* WI-4

RAILS · TRACK EQUIPMENT · PIPE · PILING

L B FOSTER CO.
PITTSBURGH 30 NEW YORK 7
CHICAGO 4 HOUSTON 2 LOS ANGELES 5

3460 Wilshire Blvd. Los Angeles 5, Calif.

HELPFUL LITERATURE

Thin wall construction

This new 12-page brochure describes new thin curtain wall construction techniques covering porcelain enamel panels, aluminum and stainless steel facings, concrete panels, and spandrel construction with photographs and details, including fabrication and job data, of important projects utilizing latest techniques. In two colors, "Foamglas in Thin Wall and Sandwich Panel Construction" also includes a summary of an accelerated aging test of an architectural panel. *Pittsburgh Corning Corp., One Gateway Center, Pittsburgh 22, Pa.*

Parallel shaft gear drives

A complete line of parallel shaft gear drives is described in Link-Belt Co.'s 32-page book No. 2619. Listed are 39 standard size drives for efficient vibration-free transfer of power and a complete line of baseplates and built-in backstops. The magazine-size catalog offers photos of new equipment and detailed data and specifications. *Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.*

Industrial liquid metering

Methods of industrial liquid metering with multistage quantity control valves are described in a new 6-page bulletin (O. G. 454). "Rockwell Multistage Quantity Control Valves" illustrates and describes meters, valves, registers, and other metering equipment. *Meter and Valve Division, Rockwell Manufacturing Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.*

High vacuum pumps

This 4-page, 2-color bulletin (V-54) provides a quick but comprehensive view of a complete line of high vacuum pumps, ranging in size from a ¼-hp. unit which has a displacement of 2 cu. ft. per minute to a 40-hp. unit having a displacement of 780 cu. ft. per minute. Bulletin supplements firm's catalog and separate bulletins on individual models, and includes material on bronze, cast iron, and fabricated steel vacuum tight valves. *Kinney Manufacturing Division, The New York Air Brake Co., Boston 30, Mass.*

Southern Engineering services

A 3-color, 4-page display and description of Southern Engineering and Construction Co.'s engineering and construction services is offered by that firm. Write to *Southern Engineering and Construction Co., 2650 Cherry Ave., Long Beach 6, Calif.*

Rotary pump products

A new 8-page catalog shows complete line of standard Roper pump products, including a new line of low speed, high torque hydraulic pump motors. Roper rotary pump catalog 955 may be obtained from *Geo. D. Roper Corp., Rockford, Ill.*

Barrel finishing abrasive

This 4-page bulletin (Form ESA-236) describes aluminum oxide lumps and grain for barrel finishing a wide variety of parts and materials. Write to *Simonds Abrasive Co., Tacony and Fraley Sts., Philadelphia, Pa.*

Pump
ABRASIVES,
ACIDS,
CORROSIVES,
with John BEAN
INDUSTRIAL
PUMPS

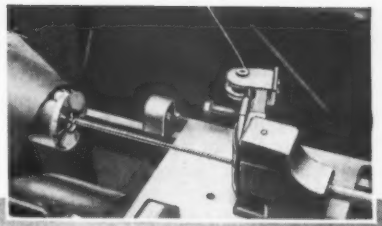
WRITE for applications catalog.

fmc

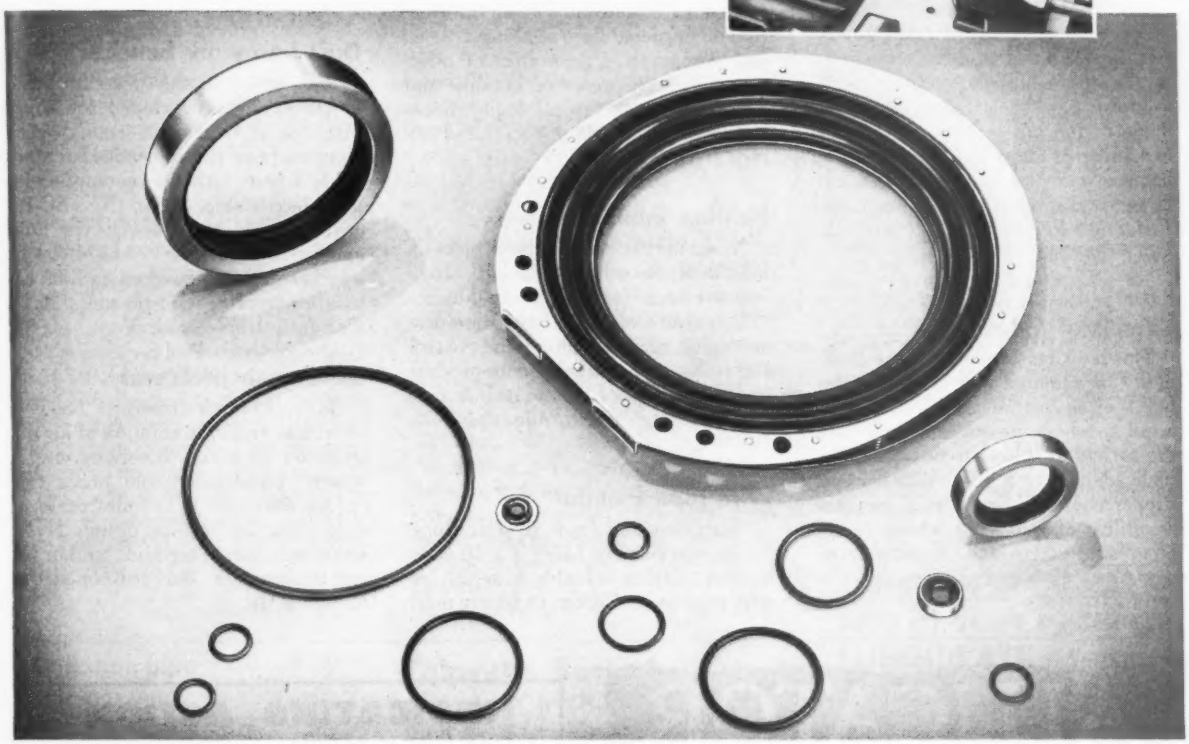
John Bean Pumps are designed to handle gritty and corrosive materials, creosote, paint remover, drilling mud, bordeaux mixtures, varnish, paint and silicone resins. High-pressure does it! Diamond-tough Sapphite cylinders resist wear and stay glass-smooth!

* *Built for long-life and efficiency!*
* *All parts accessible for easy maintenance!*

FOOD MACHINERY and CHEMICAL CORPORATION JOHN BEAN DIVISION
Dept. WI, P. O. Box 145, San Jose 1, Calif.



Winding a coiled spring is done on a small mandral by this machine. Later, the spring is cut to length and assembled on another machine which, like the one pictured, was designed by engineers of National Motor Bearing Company, Inc., Redwood City, California.



A sampling of the 5000 standard oil seals and springs manufactured by National is shown above. An integral part of many of these oil seals are close-wound helical springs—made from select USS Manufacturers Wire.

Special wire assures "uniform tension" in oil seals

Among the different type oil seals made by National Motor Bearing is a revolutionary new one—part of a lubricating system designed to eliminate practically all hot boxes from railroad cars. An important part of this new seal (shown above, upper right) is a coiled spring. To achieve proper tension these springs must be formed from wire that has *uniform tensile* properties. Metallurgists at United States Steel *tailor-made* a wire to fit National Motor Bearing's particular requirements. The company's engineers report that the USS wire "completely fills our needs".

With the greatest wire-making facilities in the West, Columbia-Geneva can supply more than 1,000 types, grades and finishes of USS Manufacturers Wire. For information and technical assistance, write: Columbia-Geneva Steel Division, 1403 Russ Building, San Francisco 6, California.

Free Booklet! WI-4

UNITED STATES STEEL CORPORATION
COLUMBIA-GENEVA STEEL DIVISION
1403 RUSS BUILDING
SAN FRANCISCO 6, CALIFORNIA

Please send me your free, informative booklet that shows how USS Manufacturers Wire can be tailored to fit my needs.

*Name*_____

*Address*_____

*City*_____ *State*_____

Wire that's tailored to fit your needs

USS Manufacturers Wire

UNITED STATES STEEL

HELPFUL LITERATURE

A line on welding

New 36-page catalog shows Air Reduction's complete line of arcwelding and oxyacetylene welding supplies and accessories. Chemical and mechanical properties are listed for welding rods; specifications and other data are given for electrode holders, welding cable, weld-cleaning tools, and electrodes. Some of the other products included are brazing alloys, goggles, welding helmets and face shields, gloves, cylinder trucks, and carrying cases. *Air Reduction Pacific Co., 220 Bush St., San Francisco*

Wheels of industry

This booklet issued by Bronco Products Co. explains and illustrates the types of industrial wheels manufactured by the company and describes the variety of rubber treads available, each adapted to a particular service. Proper choice of bearings to increase flexibility of industrial wheels is another subject covered. *Bronco Products Co., 717 Stanford Ave., Los Angeles 21*

Absco Metal castings

Eight-page illustrated folder (B-101) describes nine most generally used Absco Metal types in tensile strength range of 25,000 to 55,000 psi. and gives in considerable detail advantages claimed for this graphite-controlled material. Engineering information on hardenability, section strength, and comparative properties of other cast metals are presented in tables and text, as well as typical applications. *American Brake Shoe Co., 230 Park Ave., New York 17*

Pickling inhibitors

New bulletin on Houghton pickling inhibitors describes Acitrol 3129, an improved non-foaming heavy-duty inhibitor; Acitrol 3130, new foam-producing pickling inhibitor; and Acitrol Foam 25, new cationic foam-producing chemical. *E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.*

Wire rope manual

"Handling and Care of Wire Rope for Longer Service Life" is a 40-page booklet offering valuable material for wire rope users. Fifteen pages are used to present a step-by-step picture story of wire rope splicing, as demonstrated by a veteran in the technique at company's Williamsport, Pa., plant. Available at sales office of *Bethlehem Pacific Coast Steel Corp., Seattle, Spokane, Portland, San Francisco, and Los Angeles.*

Dust-free work benches

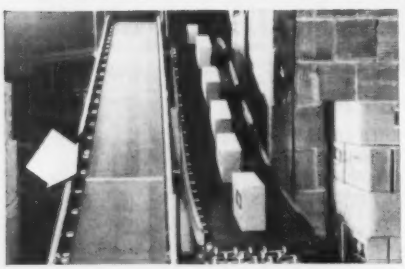
Two new bulletins describe Sterilshield cabinets developed for superprecision instrument assembly operations and now recommended for many fields where airborne contamination is objectionable. Form No. SC-120 covers Model 12, a bench-type unit; and Form SC-140 describes Model 14, a larger floor-mounted unit which can handle several workspace units. *Baker Co., Inc., Maplewood, Me.*

Solving air problems

Barber-Colman catalog (F 6597) is offered as an aid in solution of air distribution problems involving use of square, rectangular, and linear type ceiling diffusers. It includes performance data for use in design layout stage, installation methods, and ordering information. *Barber-Colman Co., Rockford, Ill.*

ALLIGATOR®

CONVEYOR BELT LACING



Every Tooth A Vise*

in Long Continuous Lengths for Conveyor Belts . . . . .

- ★ Excellent for Package Conveyors, Portable Loaders, Trenching and Ditching Machines, etc.
- ★ In canneries where corrosion or rust is a problem specify Alligator made of Stainless or Monel.
- ★ For magnetic separators or anti-sparking specify Alligator made of Everdur.
- ★ Separable and smooth on both sides.
- ★ 12 sizes. For belts from 1/16" to 5/8" thick—and *any width.*

Order from Your Supply House. Ask for Bulletin A-60.

FLEXIBLE STEEL LACING CO. 4642 Lexington St., Chicago 44, Ill.

JUST A HAMMER TO APPLY IT

INDICATING ACTION BY STERLING TELLS AND SELLS

TYPICAL APPLICATIONS THAT IMPROVED PRODUCT INTEREST AND INCREASED SALES ACTION

SEE — Points the way to best reception for users of T.V. antenna rotors — combines action, interest and information — modern styling, too.

HEAR — For the hearing aid industry — a transistor type battery tester to keep aid users informed and gain peak efficiency.

FEEL—Designed to indicate the proper moment that electrical mixing equipment has completed its work efficiently.

SEND FOR— interesting file folder of standard and special application panel meters—ammeters, voltmeters, etc.

THE STERLING MANUFACTURING COMPANY

Your inquiry is invited—write

7201 Wentworth Avenue
Cleveland 2, Ohio

Fleet maintenance cleaning

This 12-page booklet is intended to cover the whole range of maintenance cleaning of automotive fleets so that a shop foreman can easily find the answer to his specific problem. The booklet details materials, solution strength, temperature, methods, and equipment for each specific job, with separate sections devoted to parts cleaning, floor cleaning, radiator and cooling system cleaning, among others. *Oakite Products, Inc., 1001 E. First St., Los Angeles 12, Calif.*

Floor patching and resurfacing

A pocket-size folder describes Stonhard Stonpach, designed for durable patches or complete overlays where acid, grease, and oil conditions have pitted and destroyed concrete surfaces. Material is claimed to outlast concrete many times over with a covering only ½ in. in thickness. Recommended for severe floor conditions found in dairies, canneries, bottling plants, breweries, processing plants, etc. *Stonhard Co., 1306 Spring Garden Street, Philadelphia 23, Pa.*

Taylor Forge foundation pipe

This bulletin describes characteristics of Taylor Forge foundation pipe for piling and illustrates its application in construction of bridges and buildings. Sizes of pipe commonly used for piling are listed and driving ends preparations, i.e., drive sleeves and drive points, are shown. Bulletin 542 is available from *Taylor Forge & Pipe Works, P. O. Box 485, Chicago 90, Ill.*

Industrial television

A 4-page folder, Catalog E 51, describes Radio Corp. of America's new ITV-6 industrial television equipment with applications, construction details, and specifications of the new closed circuit equipment. Write to *Radio Corp. of America, Engineering Products Division, Building 15-1, Camden 2, N. J.*

Power transmission catalogs

Four new fully-illustrated catalogs are available from this company, covering following lines: Wedgbelt drives (WBC-55-2), conveyor pulleys (CPC-55-2), Shaft-King speed-reduction drives (SRC-55-2), and flat-belt drives (FBC-55-2). *American Pulley Co., 4200 Wissahickon Ave., Philadelphia 29, Pa.*

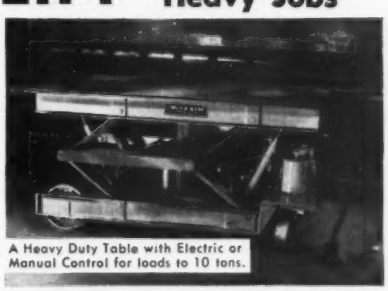
Catalog on Contour-matics

Twenty-page catalog on new DoAll Contour-matic machines is studded with on-the-job photographs of these versatile semi-automatic machines that saw, file, polish, and grind. Text lists exclusive features, such as the Demon high-speed steel blade, and sizes and models of Contour-matics available. Also covered is company's line of manually operated Contour sawing machines and accessories for band machining, such as tool guides, circle cutting attachment, and foot switch. *DoAll Co., Des Plaines, Ill.*

Aluminum bus conductors

A 12-page booklet, prepared for manufacturers, utilities, architects, and engineers, describes the availability, properties, advantages, and methods of joining and bending aluminum electrical bus conductors. Conveniently tabulated information on thermal, electrical, and physical properties, dimensions, weights, and tolerances for a large range of shapes, alloys, and sizes of bus conductors is contained in the booklet. *Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, Calif.*

Take the Back-breaking LIFT out of the Heavy Jobs



A Heavy Duty Table with Electric or Manual Control for loads to 10 tons.

Weld-Bilt HYDRAULIC LIFT TABLES

You don't need "muscle-men" for heavy dies, sheet steel, or big machined parts with WELD-BILT Hydraulic Tables. Just adjust Table to loading height, slide parts on easily. Then move to machine position, raise or lower to working height.

Write for latest bulletin and prices.

SALES REPRESENTATIVES:

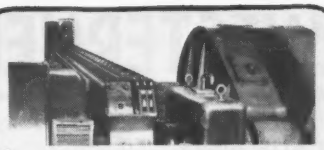
SAN FRANCISCO:
Hamerslag Equip. Co., 45 Elmira St.

SO. CALIFORNIA and ARIZONA:
Keville Industrial Service
P.O. Box 1049, Pomona, Calif.

WASHINGTON and OREGON:
Hallidie Machine Co.
Seattle: 210 Hudson St.
Spokane: N. 2-605 Division St.
Tacoma: 200 Floral Bldg.
Portland: 1545 S.E. Union St.

WEST BEND EQUIPMENT CORP.
MATERIALS HANDLING ENGINEERS

307 West Water Street, West Bend, Wis.



"THIS LUBRICANT ENABLED US TO INCREASE PRODUCTION"

says—PITTSBURGH TUBE COMPANY

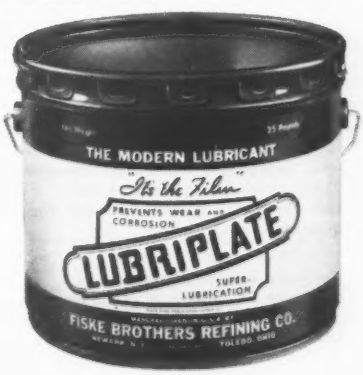
"Our 70,000 pound Draw Bench was designed to operate at a maximum of 80 feet per minute, full load. We decided to increase the drawing speed on lighter tubing to 100 and 104 feet per minute. This overloaded the Speed Reducer, however, causing it to overheat. We tried four different makes of oils without success before trying LUBRIPLATE A.P.G. 90. With LUBRIPLATE, we are able to pull heavier tubing than before at 104 feet per minute without the Reducer overheating."

R. S. Vorous
Maintenance Engineer

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.



WESTERNERS AT WORK

CALIFORNIA

Air Equipment Co., Inc.

Keith Sorenson, chief engineer of this Los Angeles manufacturer, is named vice-president-engineer.

Link-Belt Co.

Russell J. Geitman is appointed chief engineer for company's plant in San Francisco. He joined company in 1928 and transfers from Chicago Pershing Road plant.

R. J. Geitman
Link-Belt Co.

C. J. Woodard
Rucker Co.

Rucker Co.

Clarence J. Woodard, formerly sales manager of this Oakland manufacturer of power systems and components, is appointed vice president in charge of sales and engineering.

Santa Fe Railway

M. D. Breeden is appointed communications engineer for railroad at Los Angeles, succeeding *Martin A. Johnson*, retired. Mr. Breeden, who joined company in 1945, has been telephone engineer at Topeka since 1952.

Servomechanisms, Inc.

Harold R. Larsen, vice president of this company, which has main offices in New York, is appointed general manager of its Eastern and Western divisions. He was formerly manager of Western division.

Smoot-Holman Co.

This Inglewood company employs *Bill Jones* as full-time research engineer. Mr. Jones operated a consulting service prior to this appointment.

Adams-Rite Manufacturing Co.

John E. McClintock becomes manager of manufacturing, aircraft division, of this Glendale firm. He has been associated with International Business Machines, Lockheed Aircraft, and Mission Appliance Corp.

C.I.T. Corp.

William G. Cathcart is named regional vice president of this equipment financing firm, supervising company's operations in 21-state area which includes states of Colorado, New Mexico, and Wyoming. His headquarters are in Chicago.

California Redwood Assoc.

George W. Nelson is promoted to newly created position of director of quality standards. He has been with Association since 1932, since 1937 as chief inspector.

Fairchild Camera and Instrument Corp.

Robert L. Woltz is appointed military products manager for West Coast by this manufacturer, which has its main offices on Long Island, N. Y. Mr. Woltz, whose headquarters will be in Pasadena until completion of company's new facilities in Los Angeles, has been a consultant and trade association representative for Hughes Aircraft.

Furane Plastics, Inc.

Ben Carroll, former materials engineer of Sandia Corp., joins Furane in Los Angeles as research director.

Pastushin Aviation Corp.

Barry B. Willis is promoted to newly created position of executive vice president and general manager of this Los Angeles manufacturer. He was formerly vice president-operations, joining firm about six months ago. *Harold Pender* is appointed production manager. Prior to joining company, Mr. Bender was chief administrative engineer of Norris-Thermador Corp. *Larry Kooi* is appointed manager of material control. He formerly held this title with Grand Central Aircraft Co., Glendale.

American Liquid Gas Corp.

Roland Usher *R. E. Barnes*
American Liquid Gas Corp.

Three executives of this Los Angeles firm move up to rank of vice presidents: *Robert E. Barnes*, former manager of carburetion sales, is named vice president of carburetion division. *Lester L. Luxon*, former manager of unit construction department, becomes vice president of gas plant division. *Roland Usher*, who has been in charge of fuel sales for Algas Fuel Service, Inc., a subsidiary, is now vice president of this operation.

Davidson Plywood and Lumber Co.

Richard S. Bartlett, Jr., is appointed president of this Los Angeles company, a subsidiary of Atlas Plywood Corp. of Boston. Mr. Bartlett, who succeeds *Jack Davidson*, was formerly general manager. *John Eells* and *Chandler Hart* are named vice presidents; *W. Robert Brown* becomes treasurer; and *W. O. Poor*, secretary.

Caterpillar Tractor Co.

Tony Pavack, former production superintendent, is named to newly established second position of assistant factory manager at San Leandro plant. *Carl Dietz*, assistant factory manager since 1947, is placed in charge of production departments. *Al Smith*, former general foreman, moves up to production superintendent, and is succeeded by *Ed Hooper*, former special assignments general foreman.

Kaiser Steel Corp.

B. J. Osborne is appointed assistant to vice president and general manager of Kaiser Steel and placed in charge of new fabricating division which will operate plant recently acquired from Union Steel Co. of Los Angeles. Mr. Osborne joined Kaiser Steel in 1947. *S. Charles Knight* is named general traffic manager, moving up from position of assistant general traffic manager which he has held since 1949.

William H. Kinney is appointed resident metallurgical engineer for company in Oakland, to act as liaison between customers and sales and operating divisions on metallurgical development work in Northern California. He has been with company since 1948.

Northrop Aircraft, Inc.

Robert R. Miller is elected to post of vice president and executive assistant to president of this Hawthorne aircraft company. His last post was as assistant to president of company, which he joined in 1951. *Melvin P. Espy* is appointed to newly-created position of assistant director of engineering at Anaheim division. He has been chief of special weapons section for Canadair, Ltd., in Canada.

Convair Division
General Dynamics Corp.

Dr. Frederic de Hoffman joins Convair, San Diego, as assistant vice president for nuclear planning. For past eleven years he has been associated with Los Alamos Scientific Laboratory. In his new post he will work closely with group of thirteen scientists engaged as consultants by Convair to assist in special problems in development of aircraft and missile systems for armed forces. Group includes *Dr. Hans Bethe*, *Dr. Edward Teller*, *Dr. Mark M. Mills*, *Dr. Milton S. Plesset*, and others.

Chrysler Corp.

Robert T. Keller, vice president of corporation, is placed in charge of West Coast automotive plant operations, with headquarters at Los Angeles plant.

R. T. Keller
Chrysler Corp.

W. M. Jaekle
Southern Pacific Co.

Southern Pacific Co.

W. M. Jaekle is named chief engineer of company's Pacific lines, succeeding *E. E. Mayo*, who is now vice president of Southern Pacific Pipe Lines, Inc., newly organized SP subsidiary. Mr. Jaekle will have offices in San Francisco.

Kelite Products, Inc.

Louis McDonald is elected vice president and technical director of this Los Angeles manufacturer of industrial chemicals. For past three years he has been laboratory director.

2001
is exclusively a
BUTLER NUMBER

It means a lot to you—2001 is the number of operations performed on an average-sized Butler steel building. There are actually 2001 precision operations done by Butler, including die formings, gang punching, miterings, weather sealings—that are not general steel building practice.

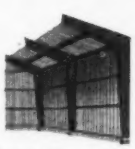
It means quick erection—Every piece is finished. No shearing, welding, shaping in the field. No nails, no gingerbread cover-ups.

It means sound buildings—No gaps, no joints to flash. Your building is as airtight and weatherproof as any conventional type.

It means low cost—The saving in unnecessary metal alone is considerable. With every part completely finished, erection costs are low.

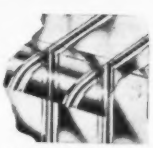
2001 is not a fancy phrase like "a thousand and one." It's real. It is what makes Butler steel buildings different —better—and most economical in the long run.

Extras like these make* BUTLER *steel buildings your best buy

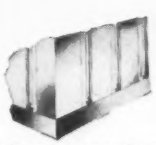


Rigid frame gives you clear spans. No interior posts, every cubic foot of interior space is usable.

Bolts—all bolts! Nails or hooks won't do in Butler buildings. Nothing holds and seals like a bolt.



Mitering is done where sidewalls meet eaves... a Butler extra that assures permanent joints.



Weathersealed windows and base. Factory-sealed, they are flush at every point and rain-tight.

Die-formed roof-ridge panel seals the ridge, eliminates makeshift field flashing.

High-rib panels are die-formed, have great deflection strength—easier to seal, better looking.

BUTLER

BUTLER MANUFACTURING COMPANY

Manufacturers of Oil Equipment • Steel Buildings • Farm Equipment
Dry Cleaners Equipment • Special Products

Factories located at Kansas City, Mo. • Minneapolis, Minn. • Galesburg, Ill.
Richmond, Calif. • Houston, Texas • Birmingham, Ala.

Mail coupon today for free booklet

For prompt reply address office nearest you:

BUTLER MANUFACTURING COMPANY
Dept. 72A, Richmond, California

Please send me name of my nearest Butler dealer and also your free folder on new Butler Panl-Frame steel buildings.

Name_____

Firm_____

Address_____

City_____ Zone____ State_____

WESTERNERS AT WORK

Hunt Foods, Inc.

Carl Kalbfleisch is named to fill newly established post of vice president of manufacturing for this Fullerton firm.

Consolidated Engineering Corp.

This Pasadena instrument manufacturer names *Armand F. DuFresne* to newly created post of chief product engineer. Mr. DuFresne has been with company since 1945, for past three years as staff assistant to vice president in charge of manufacturing. *Clarence J. Sellner* is named production manager at Hastings Ranch plant. He has been with engineering division since 1946, last holding post of production coordinator. *Jack K. Walker*, manager of firm's analytical instrumentation group since August 1953, is transferred to systems division as project chief for process control systems in chemical, petrochemical, and petroleum industries. *John L. Kent*, former technical editor, joins company as chief of a newly organized editorial bureau, charged with improving staff technical writing.

Francis T. Greenup joins firms as chief design engineer, to direct new product design, engineering drafting, and operation of model shop. He was formerly division engineer for Vitro Corp. of America in Washington, D. C. *C. William Bailey*, who joined firm in 1953 as supervisor of analytical service, is named manager of analytical service laboratory. *Robert C. Hoffman*, former application engineer in technical services department, is appointed supervisor of application engineering for development and design of new analytical and control instruments.

Pacific Airmotive

John F. Davidson becomes assistant to president and board chairman of this Burbank company. *L. B. Littrell*, former manager of company's Burbank aircraft division, is appointed vice president of aircraft service. *William Maxfield*, who was previously in aircraft sales for company, succeeds Mr. Littrell.

Soule' Steel Co.

C. H. Peterson *Frank Kullmer*
Soule' Steel Co.

Two new vice presidents are named by this San Francisco manufacturer: *Frank Kullmer*, formerly chief engineer, and *W. B. Reinheimer*, formerly treasurer. *C. H. Peterson* is appointed chief engineer to succeed Mr. Kullmer. His former position was manager of research and development.

Mercast Manufacturing Corp.

A. F. Anzlovar is named vice president of this LaVerne manufacturer, a subsidiary of Mercast Corp., New York.

Pacific Lumber Co.

Stanwood A. Murphy is named resident manager of company's Scotia plant. He has been with firm since 1945. *Edward Carpenter* is named assistant manager, *Gordon J. Manary*, vice president and general manager, relinquishes management of plant to devote his time to development of company's resources.

Pacific Moulded Products Co.

This Los Angeles corporation names executives of its former partnership, *Volney S. Anderson*, *Theodore L. Tafe*, and *Clyde E. Wilson*, to posts of executive vice president, vice president-sales, and vice president-production, respectively. *Charles D. Thurmond* is elected vice president and secretary.

ElectroData Corp.

Harry K. Withrow joins this Pasadena electronic computer manufacturer as buyer in charge of outside production. He was formerly assistant purchasing agent at Beckman Instruments, Inc. In this new post he replaces *M. Stanley Lokken*, on leave of absence.

B. F. Goodrich

Raeman A. Kibler returns to company's Los Angeles tire manufacturing plant as office manager, after two-year assignment in offices at Akron. He succeeds *T. W. Blazey*, who transfers to Akron.

Malsbary Manufacturing Co.

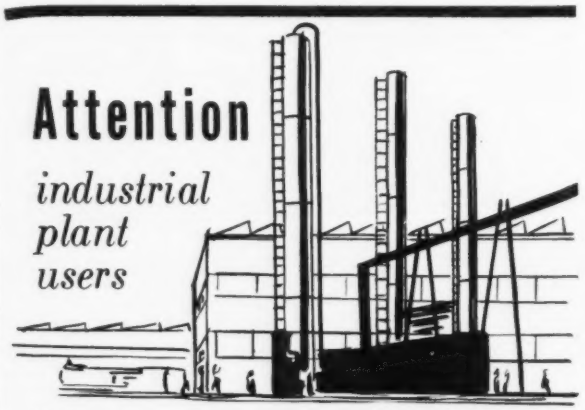
F. Hirsch becomes director of research of this Oakland company. He has been serving as consultant on machine development and design for San Francisco area firms.

The most effective dust, smoke, and fume arrestors in use today are made by REES

CLAY	COCOA	CARBON	ABRASIVE
COAL	CORK	CEMENT	ASBESTOS
FEED	FLOUR	CERAMIC	CHEMICAL
LIME	METAL	ENAMEL	FERTILIZER
ROCK	PAPER	FOUNDRY	LEATHER
SLATE	RUBBER	GRANITE	PLASTIC
SOAP	SILICA	GYPSUM	PORCELAIN
TALK	WOOD	PIGMENT	TOBACCO

REES BLOW PIPE MANUFACTURING CO., INC.
2929 FIFTH STREET BERKELEY, CALIF. • THornwall 5-2345
5714 MORGAN AVENUE, LOS ANGELES • LAfayette 0191
WRITE REES

Attention
industrial plant users



We are Power Transmission Equipment & Bearing Specialists
COMPLETE STOCKS, EXPERT SERVICE AND FAST DELIVERY

serving California since 1919
EDWARD D. MALTBY CO.
1718 SO. FLOWER ST., LOS ANGELES • RICHMOND 7-9191
Branches
4035 E. 52nd ST., MAYWOOD • LOGAN 5-5304
SAN DIEGO 745 - 15th ST
PHOENIX 120 SO. 4th AVE
LONG BEACH COWLES & SANTE FE

Radioplane Co.
A. W. Callam and *W. P. Patterson* are elected assistant vice presidents of this Van Nuys subsidiary of Northrop Aircraft, Inc. Mr. Callam, who joined company in 1942, will be in field of military relations, and Mr. Patterson, who began his service with company in July 1954 as assistant director of weapon systems division, will work in engineering.

Rheem Manufacturing Co.
New general manager of company's appliance division is *Stewart S. Battles*, former vice president, manufacturing, for Norge division of Borg-Warner Corp. *Dr. Emory L. Ellis* is appointed director of ordnance planning of research and development laboratories. From 1945 to 1954 he worked at U. S. Naval Ordnance Test Station at Inyokern, Calif., last holding post of head of rocket department.

Rockport Redwood Co.
Charles E. Matkin is named resident manager at Rockport for this lumber firm. *Leslie I. Holmes*, vice president and general manager, moves his office to Cloverdale. *K. M. Bradshaw* joins company as timber manager.

Sylvania Electric Products Inc.
Henry Lehne, director of company's electronic defense laboratory in Mountain View, is appointed general manager of newly created electronics systems division, with headquarters in Buffalo, N .Y.

Wilco Co.
S. Jerome Tamkin becomes vice president in charge of manufacturing for this Los Angeles chemical company and will continue as manager of industrial and commercial sales division. He joined Wilco in 1948.

Weyerhaeuser Timber Co.
David S. Troy becomes branch manager of company's Klamath Falls operations, succeeding *Hugh B. Campbell*, who has retired. Mr. Troy was formerly with Weyerhaeuser Sales Co. in St. Paul, Minn.

Longren Aircraft Co.
Warren G. Knieriem is named vice president of manufacturing and engineering by this Torrance aircraft manufacturer.

Hazel Atlas Glass Co.
Elmore L. Casey becomes Pacific Coast regional manager of this San Francisco company, succeeding *Fred L. Bower*, who will retire this year.

Hoffman Electronics Corp.
Vice Admiral John B. Moss, U. S. Navy (Ret.) is elected president of Hoffman Laboratories, Inc., wholly owned subsidiary of this Los Angeles manufacturer.

New quality control manager of Hoffman radio division is *James T. McAllister*, who for past three years has been company's national service manager.

Pacific Intermountain Express
Carl L. Hoebner joins this Oakland motor carrier as director of purchasing, a newly established position. He comes to firm from post of general manager, West Coast division, of Trailmobile, Inc.

Eitel-McCullough, Inc.
Russell Rhoades is appointed director of equipment manufacturing for this San Bruno manufacturer. He was formerly an assistant in this department.

JOHNSON
GEARS

SPUR • HERRINGBONE
WORM • HELICAL
STRAIGHT & SPIRAL BEVEL
RACKS • SPROCKETS

GEAR CUTTING
GRINDING
MACHINE WORK
HEAT TREATING
RIGHT ANGLE
GEAR DRIVES

MEMBER OF AGMA

Gears Made the Way You Want Them

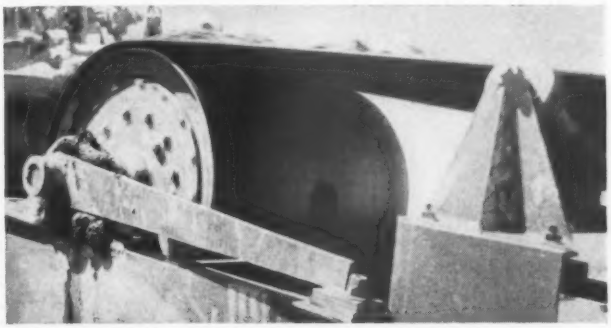
Ability to follow specifications comes from knowledge gained through experience. Johnson gears have qualities of smoothness, long life, and accuracy assured by nearly half a century of technical and practical application in manufacturing gears for every line of industry.

JOHNSON GEAR
AND MANUFACTURING CO.
45 YEARS SERVICE TO INDUSTRY
8th & PARKER STS.
BERKELEY 10, CALIFORNIA

"The Head Pulley with Motor Inside." Safe, compact, simple—no chains, no belts, no sprockets, no exposed motors.

Built by Yuba for sale in Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington.

Built and sold in other states by Iowa Mfg. Co., Cedar Rapids, Iowa.



IF YOU USE BELT CONVEYORS OR BUCKET ELEVATORS

SAVE SPACE, CUT DOWNTIME
with YUBA-SCHROCK HEAD PULLEY

All moving parts fit compactly inside pulley shell, protected against weather and dirt, thus practically eliminating pulley troubles. This pulley with motor inside requires no more room than an idler pulley; can be installed quickly. Diameters 10½" to 56". ⅓ to 125 hp. for voltages to 2300. Job proved. Write TODAY for folder and name of nearest distributor.

YUBA DREDGES — PROVED DEPENDABILITY AROUND THE WORLD

YUBA MANUFACTURING CO.
82 Pulley and Sprocket Dept.
PHONE 628 BENICIA, CALIFORNIA

YOU'RE SURROUNDED

. . . by Milford's 5 plants and 19 offices, strategically located to give you top quality tubular rivets, fast deliveries and expert service. Try us — soon!

THE MILFORD RIVET & MACHINE CO.

Plants: Milford, Conn.; Norwalk, Calif.; Elyria, Ohio; Aurora, Ill.; Hatboro, Pa.

Offices: Atlanta, Chicago, Cleveland, Detroit, Fort Worth, Indianapolis, Newark, New York, Pittsburgh, Racine, St. Louis, St. Paul, San Francisco, Seattle; Norwalk, Calif.; Stratford, Conn.; Charlotte, N. C.; Seneca Falls, N.Y.; Jenkintown, Pa.; Westwood, Mass.

Headquarters for RIVETS
Tubular, split and special cold-formed
and Rivet-setting Machines

WESTERNERS AT WORK

COLORADO

Colorado Fuel and Iron Corp.

R. Gordon Edgar becomes assistant roll designer at Pueblo plant, moving up from position of general foreman in roll shop.

Wilson and Co.

John D. Petry is appointed manager of company's Denver plant. From 1950 to 1952 he served as assistant manager, and from 1952 up to this appointment, as general sales manager.

MONTANA

Montana Power Co.

Ray M. Ball is appointed chief engineer of this Butte power company, succeeding *H. E. Chambliss*, retired, who now will be associated with company in a consulting capacity. Mr. Ball has 25 years of service with firm.

NEVADA

Kennecott Copper Corp.

Recent promotions of supervisory personnel in Nevada Mines division are: *William Mansfield*, former chief engineer, power plant, becomes assistant mechanical-electrical superintendent. *Theo L. Anderson*, former master mechanic, becomes mechanical superintendent, mining department. *Scott L. Burrill* is appointed regular mill general foreman. *George L. O'Boyle* is promoted from machine shop foreman to mechanical department general foreman, and *Donald B. Tate* from tool room machinist to machine shop foreman.

OREGON

Chapman Manufacturing Co.

Arthur VanderSys becomes executive vice president and general manager of this company's Corvallis plant.

Pictsweet Foods

Glen Grader is transferred from company's Ellensburg plant to serve as manager of Albany plant.

M and M Wood Working Co.

Carl Walker *A. T. Nelson*
M and M Wood Working Co.

Carl Walker is named general manager of all California operations of this plywood, door, and lumber company, which has main offices in Portland. Formerly general manager of subsidiary Eureka Redwood Lumber Co., he will now head California division which includes this company as well as other activities. *Andrew T. Nelson* retires as general manager of all production divisions of M and M, after 36 years of association with Pacific Northwest plywood and glue industries.

Portland Gas and Coke Co.

Wesley A. Cook is elected vice president.

American Pipe and Construction Co.

John C. Silliman moves up from post of production manager to operations manager of production, engineering, and field erection for this company's Northwest division at Portland. He is succeeded by *Wm. E. Steele*, former assistant production chief. *Robert S. Edens* is named division chief engineer replacing *Ward Woody*, retired. *Jack Cottingham* transfers from South Gate plant to Portland, where he holds title of industrial engineer. *John D. Knappenberger* is named controller, succeeding *E. E. Ullrey*, resigned.

WASHINGTON

Great Northern Railway

C. M. Rasmussen is appointed assistant general manager of lines west of Williston, N. D., with headquarters in Seattle. He moves from post of superintendent of railroad's Butte division at Great Falls, Mont., where he is succeeded by *H. J. Searles* of St. Paul.

MECHANICAL SEAL permanently seals against shaft leakage. *No expensive time or material required to service these pumps.*

FRAME BEARINGS ARE GREASED FOR LIFE and *positively sealed against dirt and water.*

Trouble-free and maintenance-free, CARVER PUMPS are *"Your Best Buy for Better Performance."*

Write for complete information today.

CARVER PUMP CO., 1472 Hershey Ave., Muscatine, Iowa
Western Region Warehouse, 1530 W. 12th St., Long Beach 13, Calif.

CARVER *The quality name in pumps*

Nalleys, Inc.

Joseph G. Lehman, vice president, is appointed general manager of this food processing company. *Henry Willis*, director of marketing for Washington division, is named director of all marketing operations.

Pennsylvania Salt Manufacturing Co. of Washington

E. H. Karr
Pennsylvania Salt Mfg. Co. of Washington

Errol H. Karr is appointed vice president of this company, which has executive offices in Tacoma. He was formerly manager of technical development and has been with company for twenty years.

Kaiser Aluminum and Chemical Corp.

Alvin L. Hilleland is appointed plant engineer at Trentwood rolling mill. He was formerly works manager of Richmond, Calif., plant of Kaiser Motors Corp.

General Mills

George H. Christensen is named flour mill superintendent of this company's Sperry division plant at Spokane. *James L. Feree* is appointed superintendent of feed mill.

ASSOCIATIONS ELECT

Montana Mining Assoc.:

President, *Fred E. Burnet*, Montana Phosphate Products Co., Garrison; 1st vice president, *Charles S. Buriss*, Ideal Cement Co., Trident; 2d vice president, *John Bley*, American Chrome Co., Nye; secretary-treasurer (re-elected), *Carl J. Trauerman*, Butte.

Western Pine Assoc.:

President, *Lloyd Helmer*, president, Polson Lumber Co., Polson, Mont.; vice presidents, *George Barkhurst*, Michigan River Timber Co., Laramie, Wyo., and *A. B. Hood*, Ralph L. Smith Lumber Co., Anderson, Calif.; treasurer (re-elected), *C. T. Gray*, Stockton Box Co., Stockton, Calif.

American Society for Quality Control (Los Angeles Section):

Chairman, *Frank H. Squires*, Lear, Inc.; vice chairman, *Dr. Leslie W. Ball*, Wyle Laboratories; treasurer, *Halmond L. Parks*.

Society of Applied Industrial Engineering (Los Angeles):

President, *Oscar C. Bowman*; vice president, *Fred Bassick*; secretary, *Martha Meis*; treasurer, *Vern C. Davison*.

Executive and Technical Women of Industry (Los Angeles):

President, *Mary Greene*, Claude Michael Agency; vice president, *Virginia Green*, Central Screw Co.; secretary, *Dorothy Fuller*, Gertsch Products; treasurer, *Myrtle Hoose*, Douglas Aircraft Co.

Shortages occur in the property accounts

• A check of the property accounts against the property itself frequently reveals substantial unrecorded deductions.

Such unexplained shortages may be prevented through Continuous American Appraisal Service which keeps the property record in line with the property facts.

The AMERICAN APPRAISAL *Company*

Over Fifty Years of Service

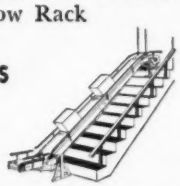
OFFICES IN PRINCIPAL CITIES

Rapistan®

MATERIALS HANDLING EQUIPMENT

GRAVITY CONVEYORS
- Wheel & Roller
- Aluminum & Steel
- Flow Rack

POWER CONVEYORS
- Permanent Belt
- Portable Belt
- Overhead Chain



INDUSTRIAL CASTERS & WHEELS
Cold-forged & Steel-forged

LOCAL WEST COAST STOCKS

LOS ANGELES E. A. Stevenson Co., Trinity 6905
820 Santa Fe Ave., Los Angeles, California

SAN FRANCISCO The Rapids-Standard Co., Inc. of Calif., Yukon 2-3880, 444 Brannan St., San Francisco 7, Calif.

SEATTLE Air-Mac, Inc. of Washington, MU 3388, 3838 4th Ave., S., Seattle 4, Washington

PORTLAND Air-Mac, Inc. of Oregon, Elmore 6524, 1435 S.E. Union Ave., Portland 14, Oregon

★ OFFICES
• DEALERS

Distributors of GE WELDING PRODUCTS

Manufacturers of
OXYGEN
ACETYLENE
ARGON
HELIUM
MEDICAL GASES
NITROGEN

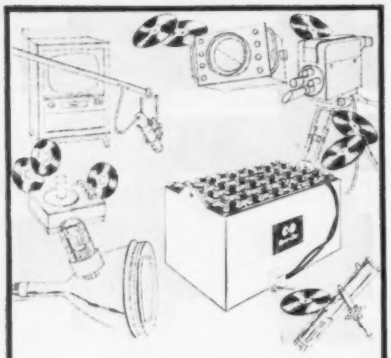
Faster, better service made possible by the convenient location of an Indair dealer near your business. Dial Indair for your welding and cutting needs.

INDUSTRIAL AIR PRODUCTS CO.

1940—1955 OUR 15th YEAR OF PROGRESS

PORTLAND
SPOKANE
SEATTLE

YAKIMA
MEDFORD
KENNEWICK



at RCA—
C&D Industrial Batteries
for EXTRA work

RCA, pioneer and leader in the development of the phonograph, radio and television, has brought pleasure and entertainment to countless millions all over the world. Naturally, RCA uses thousands of tons of materials of all kinds to make its famous products. To help solve its materials handling problems, RCA uses C&D Slyver-Clad* batteries as one of its major sources of power for its industrial trucks employed in daily operations. For RCA, like hundreds of other important companies, has found it pays to power with C&D Slyver-Clad batteries.

C&D Slyver-Clad batteries are approved as standard equipment by all electric truck manufacturers. For further information, write for Catalog.

*T.M. Reg.

C&D
BATTERIES, INC.
of Conshohocken, Pa.

Manufacturers of Industrial Batteries since 1906
Sales and Service Offices
in Principal Cities from Coast to Coast
Export Division:
1014 Schaff Building, Philadelphia 2, Pa.

TRADE WINDS

Consolidated Freightways promotions

Newly created position of district sales manager for southern Oregon will be filled by Richard Schultze, headquarters at Roseburg. Harold P. Johnson, formerly with company's Salem, Ore., offices, receives district sales manager's position at Walla Walla, Wash. At Spokane, Ralph D. Johnson becomes sales manager, moving up from district sales managership at Walla Walla. James Tanner joins the firm as equipment development engineer and will work directly with Charles Christensen in Portland office.

Moving West

Oxy-Catalyst, Inc., of Wayne, Pa., opens first branch office in Los Angeles. The new branch headed by Alfred I. Bratton, catalyst engineer, will serve the entire West Coast in catalytic devices for air pollution control and waste heat recovery.

New FMC Portland facilities

Canning Machinery Division of Food Machinery and Chemical Corp. opens new facilities at Portland which include over 10,500 sq. ft. of space and house combined production, manufacturing, engineering, and sales functions.

Distribution manager Wyneken

Chester A. Wyneken, former Hughes Aircraft employment representative, is new distribution manager of Multi-Matic Corp., Van Nuys, Calif.

Added territory

Carl Wolff is assigned Arizona territory for sales and service of National Motor Bearing Co. products in addition to his present position as industrial sales engineer in Southern California for that firm. His headquarters will be at Downey, Calif., plant.

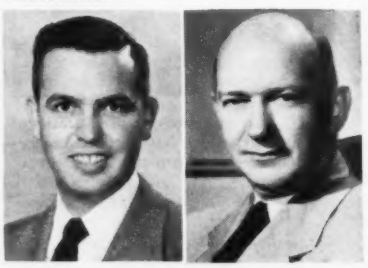
New distributors for Ledeen

Ledeen Manufacturing Co., Los Angeles, appoints fifteen new distributors, including A. E. Boyd Equipment Co. of Albuquerque, N. M., and Hawaiian Equipment Co., Ltd., of Honolulu, Hawaii.

New Western outlets

Brainard Steel Division of Sharon Steel Corp., Warren, Ohio, appoints Robco, Inc., Los Angeles, as its sales representative for Southern California and Arizona. Robert H. Braun Co., San Diego, will be dealer for Fresno and San Diego areas and Arizona for sales of Brainard's steel strapping materials.

Chain Belt



W. W. Dawson, Jr. *R. H. Longwell*
Chain Belt Co.

Wyatt W. Dawson, Jr., is promoted to district sales manager of Chain Belt Co.'s Los Angeles industrial division sales office. John Abelt, sales engineer at Los Angeles since 1953, transfers to Kansas City as district sales manager. He replaces R. H. Longwell, who moves to the company's Seattle office as assistant district sales manager.

Open Denver office

American Air Filter Co. opens new branch office in Denver to handle sales of Herman Nelson products, under sales engineer Cyril DiMercurio. Air Filter products of the company in the Denver area will continue to be handled by the Herman and Von Rosenberg organization, and dust control products sales will remain with Richards and Associates of Denver.

Packaged steam boilers

Merrill N. Musgrave Co., Seattle, is new sales representative for Dutton Boilers division of Hapman-Dutton Co. of Michigan and will serve Washington, Oregon, Montana, Alaska, and a portion of Idaho.

Shields, Harper building

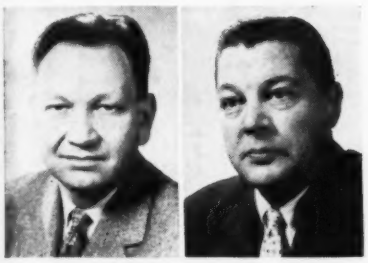
Shields, Harper Co. moves into new building in Los Angeles, which houses their Southern California and Arizona distribution operations in approximately 25,000 sq. ft. of space.

Hoffman Fresno sales division

New radio and television sales division of Hoffman Electronics Corp. is formed in Fresno. Operating principals of firm's former Fresno distributor, Kinney and Faust, will continue with new organization, with Ed Faust as general manager and John Chadwell as sales manager.

Changes at U.S. Steel

R. A. Nelson is new sales training supervisor for Columbia-Geneva division of United States Steel, headquarters in San Francisco. Mr. Nelson succeeds L. W. Thomas, Jr., who has been named staff assistant of quality improvement at the Geneva Works in Utah.



R. A. Nelson *Columbia-Geneva Div.*

R. L. Erlin *Kaiser Steel Corp.*

Erlin returns to Kaiser Steel

Richard L. Erlin returns to Kaiser Steel Corp. as manager of engineering sales in Oakland. Erlin first joined Kaiser Steel in 1944 as sales representative. For the past six years he has been with Louis Berkman Co. in Ohio.

Plastics service expansion

Dow Chemical Co. promotes Louis E. Tallman to head Western section of Plastics Technical Service, with headquarters in Los Angeles. Orwin G. Maxson moves from the company's Midland plant to Los Angeles to assist Mr. Tallman.

L. H. Butcher moves men

Dean Williams, formerly of the metal finishing sales staff in L. H. Butcher's Los Angeles operation, is new manager of Portland, Ore., branch operations. In Los Angeles, Paul Kerans moves from service engineer for Pressure-Blast equipment to sales engineer; Warren Blazer, previously chief estimator, is now sales engineer; Cloyd Cook moves from inside sales to outside sales engineer; and Charles Thomas joins staff as service engineer for Roto-Finish and Pressure-Blast equipment.

Enterprise Engine promotes

Enterprise Engine and Machinery Co., San Francisco, a subsidiary of General Metals Corp., promotes Dale W. Blanton to manager of contract engineering. Robert A. Thompson is named senior contract engineer and George Heuer, contract engineer.

Gaal with Eastern Stainless Steel

Alexander H. Gaal, Pasadena, Calif., is new Western sales representative for Eastern Stainless Steel Corp. of Baltimore, Md.

New line for Metropolitan

Metropolitan Supply Co. of Los Angeles assumes distributorship of Hoze-lok fittings and hydraulic hose assemblies manufactured by the Parker Appliance Co., Cleveland.

New Western dealers for Philips

Henry N. Beets Co., Los Angeles, now serves Arizona, Southern California, and Clark County, Nev., for Research and Control Instruments division of North American Philips Co. Braun-Knecht-Heimann Co., San Francisco and Salt Lake City, serves Hawaii, Utah, and parts of California and Nevada. Scientific Supplies Co., located in Seattle, Portland, Spokane, and Vancouver, will service Washington, Idaho, Montana, Oregon, and Alaska. Technical Equipment Corp., Denver, is to handle Colorado, Wyoming, New Mexico, and part of Nebraska.

Moving up

R. W. Hutchinson is new product sales manager for Federal Pacific Electric Co.'s Pacific Switchgear division. He will supervise promotion and execution of division's sales policies from San Francisco offices.

General Tire sales change

L. L. Higbee, former Los Angeles division sales manager for General Tire and Rubber, is promoted to trade sales manager with headquarters in Akron.

Architectural service offered

Hanley Rogers, former sales representative for Vertical Blinds Corp., Los Angeles, heads that firm's new division providing data useful to architects in planning applications of fabric vertical blinds.

Neucor expands facilities

Jackson Edwards Co. is new sales representative for Neucor Inc. in Southern California and Arizona with headquarters in Hollywood. Company manufacturers electronic instruments.

DoALL CHATTER FREE COUNTERSINKS
produce holes with a smooth, valve-seat appearance
New off-center flute design
Shears metal—does not gouge
Provides faster, more accurate cutting
Lasts longer
Available in H. S. Steel and Carbide
Consult your classified phone directory for the DoALL Sales-Service Store near you.
Sets available in 60°, 82°, 90°, 100°, 120° angles
25
Call Your DoALL Service-Store
DoALL SAW BANDS
DoALL GAGE BLOCKS
INDIVIDUAL WORKING FLATS only 22¢ each
DoALL
2"x8"x12" BLACK GRANITE
Machine Tools • Cutting Tools • Measuring Instruments
Shop Supplies • In Stock
The DoALL Company, Des Plaines, Ill.

For crane wheels and repair parts, call MOFFETT

Crane wheels heat treated to your requirements...4" to 30" diameters, tapered or straight tread, single or double flanged. We stock blanks, can ship finished wheels in 48 hours at no premium in cost.

Also sheaves, hooks, grapples, gears and pinions, gear racks, weldments, discs, rings, flanges, lift truck forks... from high carbon, alloy, stainless, or special analysis steels.

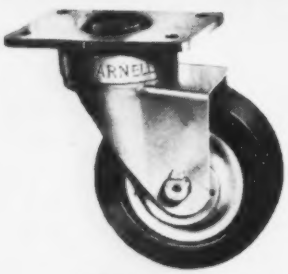
12

MOFFETT ENGINEERING COMPANY
Traveling Cranes · Hoists

Phone NOW for Quotations

579 Cleveland Ave., Albany, Calif.
LAndscape 5-4916
15 Park Row, New York 38 • WOrth 2-7048

you'll make the right choice



with

DARNELL

CASTERS ⋮ WHEELS

—MADE IN A VARIETY OF RUBBER TREADS FOR EVERY CONDITION IN YOUR PLANT..

These casters are fitted for pressure lubrication in wheel and swivel. All wearing parts are carburized and hardened. Rust-proofed and finished in Laguna Blue lacquer. Treads are available in Darnellaprene (Resilient Tread), Darnel lay (Semi-Steel) and Darnellite (a tough hard tread of synthetic material).

Free Darnell Manual

DARNELL CORP., LTD.
DOWNEY, (Los Angeles County) CALIF.

60 Walker Street, New York 13, N.Y.
36 North Clinton, Chicago 6, Illinois

TRADE WINDS

Westward expansion

Hess, Goldsmith & Co., Inc., sets up Western division headquarters in Los Angeles with Paul A. Erskine, former Western sales representative, as new Western division manager. Company is reportedly the first eastern weaver of fiberglas to establish mill representative in California.

New company formed for Weston service

Central Instrument Service in San Francisco is formed to handle repair and calibration of Weston instruments. The new firm will act as sole factory authorized service station for Western in Northern California.

Mycalex appoints R. H. Hall

Richard H. Hall, former sales manager for Cadillac Plastic Co., becomes commercial engineer for Mycalex Corp.'s Pacific division with offices in Los Angeles. Company, which has main plant in Clifton, N. J., manufacturers glass-bonded mica insulating products.

International Rectifier

Dale G. Weber Co. of Portland is new industrial and jobber representative for International Rectifier Corp., of El Segundo, Calif., in Washington, Oregon, Montana, Idaho, and Alaska.

REVOLVATOR
RED-GIANT
features
Safety-Ease

Durability — built in by 50 years of Revolvator Co. experience—is still the fundamental of the Red Giant liftruck line. Maneuverability, plus the safety of their exclusive double stroke mechanism, make the models shown leaders in their fields. There is a Red Giant liftruck available for every use—for every capacity.

Write for the full facts today.

REVOLVATOR CO.
8798 Tonnele Ave., North Bergen, N. J.

Sanko assigned special duties

A. R. Maas Chemical Co., division of Victor Chemical Works, announces assignment of George E. Sanko to special duties in sales department at company's South Gate headquarters. He moves from Maas Chemical position as San Francisco Bay and Northern California representative.

G. E. Sanko
A. R. Maas Chemical Co.

Bernard Pratte
Harnischfeger Corp.

Harnischfeger appoints Pratte

Bernard Pratte is new general manager of the Pacific division of Harnischfeger Corp., Los Angeles. Prior to the West Coast position he served as general sales manager of corporation at its home office in Milwaukee, Wisc.

Bethlehem men on their way

W. E. Ziegler, contracting engineer at Bethlehem Pacific Coast Steel Corp.'s Seattle fabricating works, is placed in charge of sales for the Pacific Northwest area, replacing H. E. Swanson, with no change in headquarters. C. N. Morse, Bethlehem Pacific's works engineer in Seattle, is promoted to district engineer for that area.

PIE promotes four

Pacific Intermountain Express, Oakland, moves men up in sales and supervisory posts. Howard Elms is new district sales manager for San Francisco-Oakland Bay area. In Los Angeles, Sam Munitz moves up to district sales manager position.

New Industrial Department

Newly opened Industrial Department of Lincoln Engineering Co. is headed by R. K. McCoy, headquarters in San Francisco. R. B. Boothby heads this department in Los Angeles and Dave John in Northern California.

Allis-Chalmers distributor

Power Service, Inc., Casper, Wyo., headed by C. W. Sissman, is new Allis-Chalmers Manufacturing Co. distributor of motors, controls, and transformers in parts of Wyoming and Nebraska.

Field men for Micro Switch

Micro Switch division of Minneapolis Honeywell Regulator Co. appoints William Van Cleve and William C. Burth, two recent graduates of the division's factory training school in Illinois, to Los Angeles sales office.

Rack Engineering appointment

Rack Engineering Co. appoints Industrial Truck Sales of San Francisco as its Northern California representative.

CLASSIFIED SECTION

Space is sold as advertisers' inches. All advertisements in this section are ⅛ inch short of contracted space to allow for borders and composition. Rates are $7.50 a column inch. Copy should be sent in by the 25th of preceding month if proofs are required; by the 28th if no proofs are required.

Business Opportunities

As manufacturers agents WE ARE READY TO HELP YOU INCREASE YOUR SALES and want items to sell machine shops, to tool and die shops, to repair shops and to maintenance men in industry IN THE MIDDLE WEST.

MANLEE COMPANY
Box 202
Park Ridge, Ill.

100 GENUINE 8 x 10 PHOTOS 10c ea

24 HOUR SERVICE!

FREE DELIVERY ANYWHERE

MADE DIRECT FROM PHOTOS (OR NEGATIVES) • 50 8 x 10 13c ea. 500 8 x 10 8c ea.

1000 8 x 10 GLOSSIES 7c EACH

POSTCARDS

5000 $21 PER M. 2½c each in 1000 lots

SAVE THROUGH QUANTITY PRODUCTION

FOR COMPLETE PRICE INFORMATION WRITE OR PHONE:

QUANTITY PHOTOS, Inc.
HOllywood 7-6179
5509 SUNSET BLVD., HOLLYWOOD 28, CALIF.
LARGEST PHOTO REPRODUCTION PLANT IN WEST

Call King TU-3176

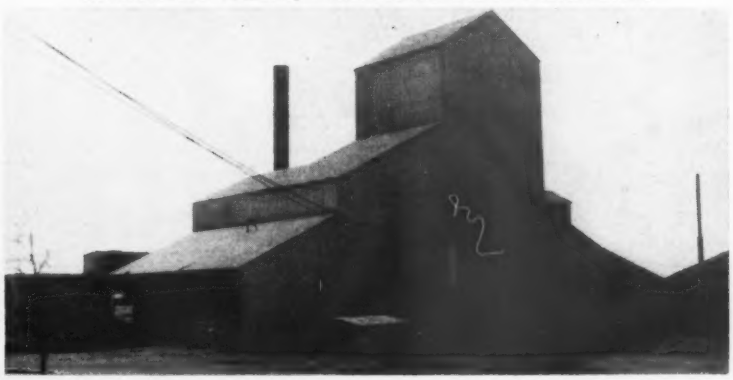
MATERIAL HANDLING EQUIPMENT

Lift Trucks • Hand Trucks • Conveyors
Hoists & Cranes
Casters & Wheels

IRVING G. KING & CO. ★ SINCE 1930
821 MATEO ST. L. A. 21

This space
costs $7.50
It will be worth
much more to you

FOR SALE
INDUSTRIAL PLANT
IN CENTRAL VALLEY, CALIFORNIA ON 76 ACRE LEASE



IDEAL LOCATION AND FACILITIES FOR PROCESSING, CHEMICAL OR MANUFACTURING INDUSTRY

3 MILES FROM CITY LIMITS • RAILROAD SIDING • WASTE DISPOSAL • FIREPROOF BUILDING • ELECTRIC POWER • NATURAL GAS • WATER • APPROX. 11,000 SQ. FT. FLOOR SPACE.

Address The Taylor-Knapp Co., Successors to

TEEKAY MINES, INC., BOX 245, TRACY, CALIF.

Office 1201 Holly Drive Brokers Protected Phone Tracy 1892

Want Ad Order Blank

Please run my ad 12, 6, 1 time (circle which) at the rate of $7.50 a column inch. Make ad 1, 2, 3 columns wide (circle which) by .....inches (specify, one to 10) deep.

Signed.....

Address.....

City..... State.....

WRITE AD HERE:

.....

.....

.....

.....

.....

.....

.....

.....

Send ad to Classified Dept.,
WESTERN INDUSTRY, 609 Mission St., San Francisco 5, Calif.

The final step in making "Milk Chocolate Drops" at the Guittard Chocolate Co., San Francisco, takes place inside this tunnel. As the "Milk Chocolate Drops" move slowly along on a conveyer belt, they're solidified by cold air blown from an air conditioner at the tunnel's far end.

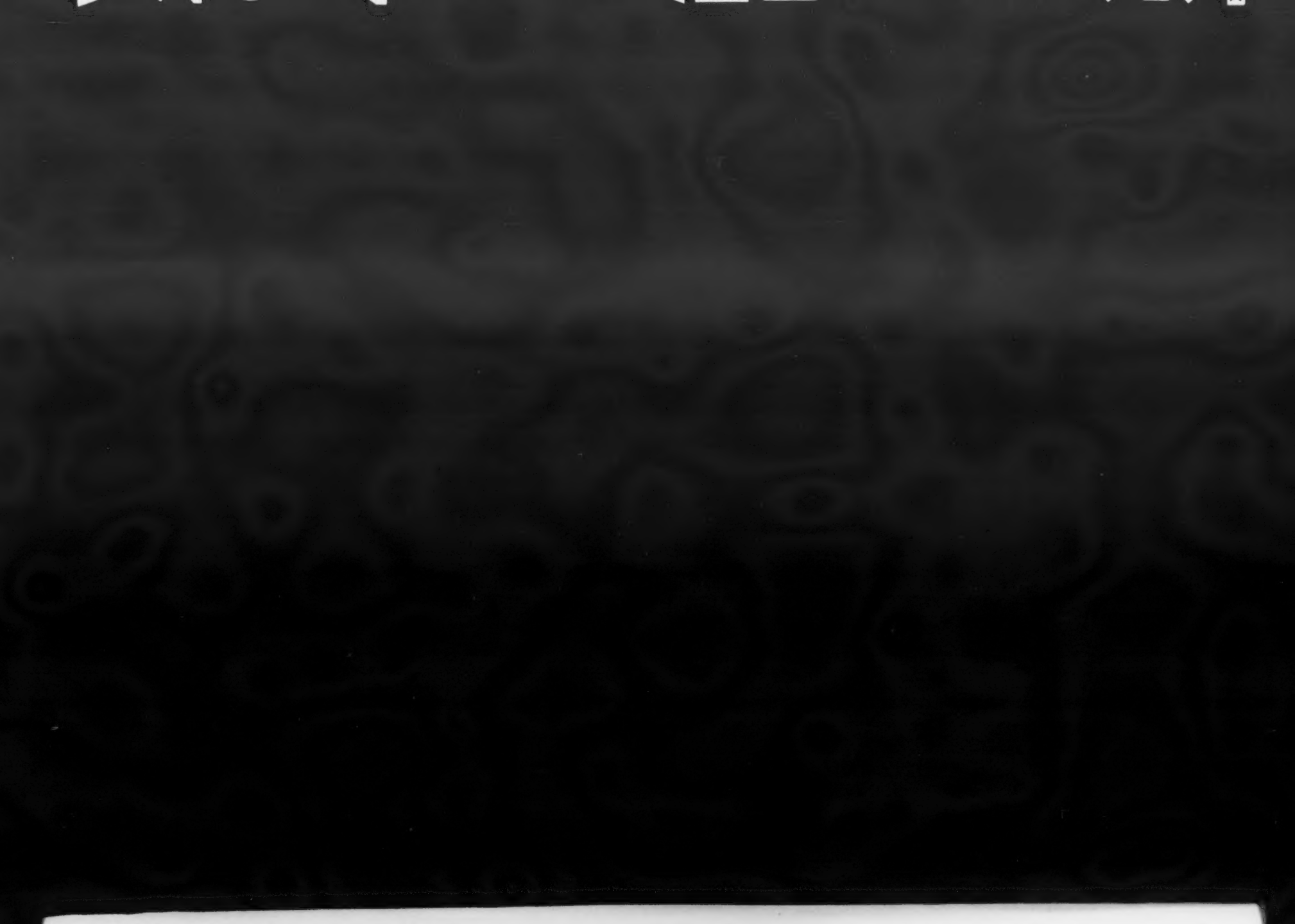
How **air conditioning** adds a finishing touch to fine candy

The people at the Guittard Chocolate Co., San Francisco, will tell you that one of their prized processing "secrets" is air conditioning. Besides high-quality ingredients and careful mixing, refining, and tempering, fine chocolate candy needs one thing more: It must solidify in just the right way. Correctly conditioned air takes care of this at Guittard's. With its 7½-horsepower air conditioner, the company now turns out an even better product . . . and has cut down on costly rejects.

Air conditioning at work in many ways today. In food manufacturing, paper mills, chemical plants, and many other fields, air conditioning is proving a real money-saver. It can boost output and quality, save on rejects, and reduce employee absences from illness. There are units of many types and makes to choose from—gas or electric models for heating or cooling . . . electric heat pumps that do both jobs. And with P. G. and E.'s low rates, the one you pick will operate cheaply.

P·G and E·
Pacific Gas and Electric Company

FOR AIR CONDITIONING ADVICE, CONTACT YOUR CONSULTING ENGINEER, CONTRACTOR, OR LOCAL P. G. AND E. OFFICE



THE West ON ITS WAY

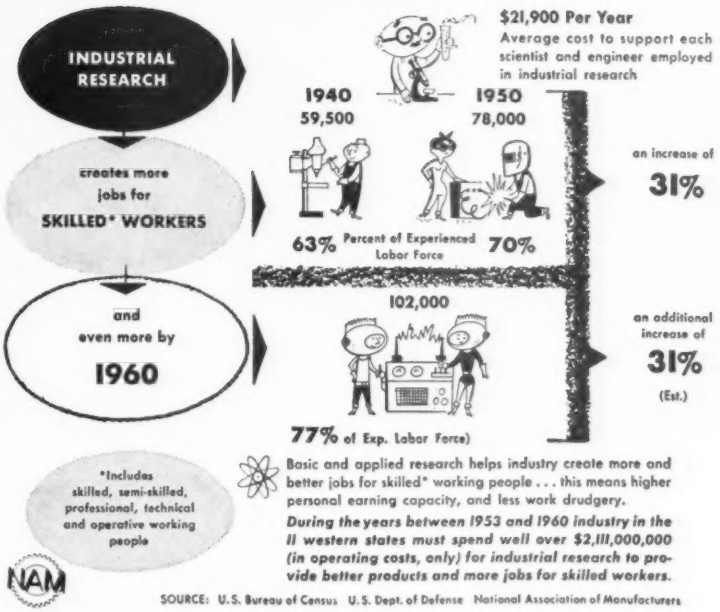
NEW PLANTS, EXPANSIONS, NEW INDUSTRIES, PRODUCTION CONTRACTS, DEVELOPMENT PROJECTS, UTILIZATION OF RESOURCES

Progress through industrial research

IT IS ESTIMATED that one industrial research scientist or engineer is employed for every 2,000 persons of the West's population. If this ratio and the West's population growth both hold constant, it is estimated that 13,000 industrial research scientists or engineers will be working in the West by 1960. This estimate is based on the Census' projected population for the eleven Western States in 1960 of 26,338,002.

The average operating cost per year per research scientist or engineer for research and development work performed in the West is $21,900, excluding capital investment. This compares with a national figure of $23,900 per research engineer or scientist employed by industry for the Federal Government during 1951. By 1960, therefore, over $2,000,000,000 will have been spent by industry just to meet the yearly cost of supporting industrial research in the West.

INDUSTRIAL OUTLOOK IN WYOMING: 1950-1960


INDUSTRIAL RESEARCH
creates more jobs for SKILLED* WORKERS
and even more by 1960
*Includes skilled, semi-skilled, professional, technical and operative working people
$21,900 Per Year
Average cost to support each scientist and engineer employed in industrial research
1940
59,500
1950
78,000
an increase of 31%
63% Percent of Experienced Labor Force 70%
102,000
an additional increase of 31% (Est.)
77% of Exp. Labor Force)
Basic and applied research helps industry create more and better jobs for skilled* working people . . . this means higher personal earning capacity, and less work drudgery.
During the years between 1953 and 1960 industry in the 11 western states must spend well over $2,111,000,000 (in operating costs, only) for industrial research to provide better products and more jobs for skilled workers.
NAM

SOURCE: U.S. Bureau of Census U.S. Dept. of Defense National Association of Manufacturers

Reinforced plastics rapidly growing

REINFORCED plastics is one of the fastest growing segments of the plastics industry according to the Society of the Plastics Industry, Inc., which reports that more than 50 California companies are manufacturing reinforced plastic products, valued at more than $100,000,000 yearly, or about 25% of the entire industry total.

Approximately 150 companies comprise the reinforced plastic industry. Half of these are located in the Western states, with the largest number in California. Reinforced plastics are structural materials originally conceived to perform military service during World War II in radar housings, body armour, and various aircraft parts. They are combinations of plastic resins and reinforcing materials.

Gas wall heaters just nine years old

IN NINE YEARS the gas wallheater industry has grown from nothing to a $22,000,000 a year business with a $9,000,000 payroll. The industry is centered in Southern California and draws its raw materials and components from the Pacific Coast. The industry was born and exists almost entirely in California, yet sends most of its products to eastern customers.

In 1953, the 23 Pacific Coast manfacturers (17 in the Los Angeles area and 6 in the San Francisco Bay area) produced 80% of the recessed wall heater units in the nation. The market for recessed gas wall heaters was created after World War II particularly in Southern California, with the mass production of basementless homes in all price brackets.

Mineral production in Alaska

VOLUME and value of mineral production in Alaska in 1954 remained at about the same level as for 1953 according to the latest Bureau of Mines report. Gold continued to lead the field with a value of $8,847,790 for 1954, but soft coal was a close second. Coal production in 1954, however, was down considerably from the previous year.

Sand and gravel produced for use in construction and road building held third place to gold and coal in value of output during 1954. Production of platinum-group metals in 1954 was increased slightly over 1953; the value of output was less than in 1953 because of the lower price of platinum. Chromite, mercury, and tin did not greatly affect the total mineral value.

A section of the April 1955 issue of WESTERN INDUSTRY— 609 Mission Street, San Francisco 5, Calif.

ARIZONA

RURAL POWER — Steam generating plant will be built by farmers in Pinal County, organized into Electrical District 3, which includes Maricopa and Stanfield. First step, $6,000,000 bond issue, is approved by vote of farmers.

THUNDERBIRD—Arizona's first oil refinery, to cost over $30,000,000, is planned for early construction in Florence-Coolidge area by Thunderbird Refineries, Inc., and is slated to be in operation within 18 months. Over-all contract has been let to Ebasco Services, Inc., New York. Firm is negotiating with Southern Pacific Pipe Lines for transport of 16,500 bbl. of crude oil per day to supply refinery through SP's proposed pipeline from El Paso, Tex., to Watson, Calif.

CUTTER STATION—Grand Junction operations office of Atomic Energy Commission leases site at Cutter, east of Globe, for construction of new uranium ore-buying station and sampling plant. Plant will be operated for AEC by American Smelting and Refining Co.

DUMP CARS FOR SAN MANUEL—San Manuel Copper Corp., San Manuel, contracts with Baldwin-Lima-Hamilton Corp., Philadelphia, Pa., for 45 bottom dump hopper cars, each of 100-ton capacity, to be used as ore carriers. San Manuel is a joint venture of Utah Construction Co. and Stearns-Roger Manufacturing Co.

CALIFORNIA

CHIKSAN JOINS FMC—Food Machinery and Chemical Corp. will acquire through exchange of stock the main plant at Brea, Calif., of Chiksan Co., manufacturer of specialized line equipment for petroleum and other industries, and the Houston, Tex., plant of Chiksan subsidiary, Well Equipment Manufacturing Corp. Plants will be operated as Chiksan division of FMC.

RECAP FOR 1954—General Motors Corp., in its 1954 annual report, states payroll last year in seven Western states totaled $49,068,165, covering an average of 10,234 employees. Previous high, in 1953, was $47,880,982. California accounted for $44,074,973 of 1954 total, with average GM employment of 9,134 persons.

EXPAND CHEMICAL OPERATIONS—Standard Oil Co. of California begins work on first units of $16,000,000 chemical fertilizer manufacturing program. New ammonia and nitric acid plant will be built at Richmond refinery, supplied with by-product hydrogen from oil refining process. California Spray-Chemical Corp., Standard subsidiary, will build fertilizer plant for converting ammonia-nitric acid into agricultural fertilizers. Standard will also market chemicals to industrial consumers through Oronite Chemical Co., another subsidiary. Work began earlier on an isophthalic plant at Richmond, adjoining phenol plant, to supply plastics and coatings industries.

RUCKER HEADQUARTERS OPEN—Rucker Co. inaugurates new headquarters building in Oakland, designed and built by Christensen and Lyons. Total floor space of 20,500 sq. ft. is available for shop and stock area, engineering and offices, and sales floor. Company designs, builds, and installs hydraulic and pneumatic power systems.

TRINITY PARTNERSHIP—Pacific Gas and Electric Co. proposes partnership construction of Trinity River water and power project in California with U. S. Bureau of Reclamation. Company would build power generation and transmission facilities and pay government $3,500,000 per year for the use of falling water.

EXPERTS—W. B. Semco and Associates, industrial engineers and consultants, is newly organized Los Angeles firm which will specialize in industrial layout and installation and management counseling. Facilities include metallurgical laboratory.

MOVE TO SAN MARCOS — Aircraft metal forming division of Coast Pro-Seal & Mfg. Co. moves from Burbank to plant of Mid-State Mfg. Co., associate firm at San Marcos.

GENERAL CONTROLS - PERFEX — Controls and instrument division of Perfex Corp., Milwaukee, Wisc., is acquired by General Controls Co. of Glendale in an exchange of stock. Division manufactures controls, thermostats, and combustion instruments.

CANOGA PARK CONTRACT—North American Aviation, Inc., awards $3,000,000 contract covering construction of rocket engine research and manufacturing plant in Canoga Park (Los Angeles).

FORD MOVES—Ford Motor Co. transfers automobile assembly operations from Richmond to new Milpitas plant, a distance of 51 miles. The 1,560,000-sq. ft. plant, employing about 1,800 persons (98% of them from Richmond), will turn out 520 cars and trucks daily on one-shift basis.

POSTPONEMENT — Olin-Mathieson Chemical Corp. allows option to expire on Red Bluff industrial site and will postpone construction of proposed cellophane plant.

BUILD IN RIVERSIDE—Grin Automotive Products Co., division of Grin Chemical Corp., starts work on $415,000 plant and office building in Riverside, which will also serve as executive headquarters for parent firm. Operations will include manufacture of brake fluids, underseals, and polishes.

BUILDING FIRST WESTERN PLANT—American Brass Co., subsidiary of Anaconda Copper Mining Co., will begin construction soon of new brass mill in Paramount district of Los Angeles, to be in full operation early in 1957. Plant, together with land purchased for this purpose in 1948, will cost about $13,000,000, and will produce copper and copper-alloy sheet, strip, rod, tubing, and drawn copper products. Participating in announcement of plans at Los Angeles were (left to right): Justice Lockwood, vice president in charge of sales, Waterbury, Conn.; Richard H. Barden, vice president, Kenosha, Wisc., C. Russell Epley, present sales manager of San Francisco office, who will move to Los Angeles as manager of new plant; and John A. Coe, Jr., president, Waterbury, Conn.

Good change for the West

MORE THAN 90 per cent of the new cars sold in California are assembled right here in this state. And today, a large proportion of these cars are being assembled with wheels made of Kaiser Steel.

This change-over to steel produced on the West Coast is being made because wheel manufacturers find they can depend on Kaiser Steel for unsurpassed quality... backed by prompt service and the fastest possible carrier delivery time.

By supplying this new market, the West Coast's only integrated independent steel plant is bringing more industry, more jobs, more wealth to the area it serves.

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • tinplate • hot rolled strip • hot rolled sheet • alloy bars carbon bars • structural shapes • special bar sections • semi-finished steels • cold rolled strip • pig iron • ingot molds • coke oven by-products • ferro-manganese • silico-manganese

For details and specifications, write: KAISER STEEL CORPORATION • LOS ANGELES • OAKLAND • SEATTLE • PORTLAND • PHOENIX • DENVER • TULSA • NEW YORK

START WORK ON TERMINAL—Richfield Oil Corp. begins construction of $4,500,000 facility at Long Beach Harbor, on 16-acre site leased from city, which will be combined with existing Richfield terminal on Channel 2. Additional storage capacity of about 500,000 bbl. and berthing space adequate for two supertankers is planned. Loading operations at terminal on Channel 3 will be discontinued when new terminal begins operation in early 1956.

PLANT AT PUENTE—Utility Trailer Manufacturing Co. begins work on first unit of planned $1,000,000 plant at Puente. First building will have 50,000 sq. ft. of floor space and will be ready for occupancy by May 15. Another 60,000 sq. ft. will be added by the end of 1956.

MECCA BUILDING — New $85,000 plant of Minnesota Electronics, subsidiary of Librascope, Inc., of Glendale, will be completed this spring in Santa Ana. The 10,000-sq. ft. machine shop will assist in production of potentioimeters and food machinery.

CALSTRIP EXPANSION — Calstrip Steel Corp., Los Angeles, will have in operation by June of this year its $500,000 expanded facilities. Company is installing new cold reducing strip mill, said to be first of type in West, roll grinder, and continuous annealing furnace, as well as auxiliary equipment and structures.

OPERATIONS JOINED—Datran Engineering Corp. moves operations to Manhattan Beach plant of parent firm, Mid-Continent Manufacturing, Inc. Datran produces and markets transducers and custom electromechanical equipment.

STUDY FARM MARKETS—Columbia-Geneva Division of U. S. Steel Corp. begins study of agricultural needs for steel in central and lower San Joaquin Valley. Requirements are expected to increase by as much as 20% in next five years because of expansion and modernization of farms.

ENTER CONTAINER FIELD—Western Corrugated Box, Inc., newly organized firm, buys 16 acres of land in San Leandro for construction of $1,000,000 container manufacturing plant. Production will begin by mid-summer in the 72,500-sq. ft. facility. Roy F. Fefley, president, and R. C. Gingg, Jr., vice president, were formerly associated with California Container Corp. at Oakland.

TEAMWORK ON BEETS—Western regional research laboratory of U. S. Department of Agriculture, located in Albany, Calif., installs $45,000 equipment for new sugar beet processing research. Funds for equipment were provided by Beet Sugar Development Foundation, organization of beet sugar producers in U. S. and Canada. Two purposes of research are to find out more about chemistry and mechanisms of each phase of sugar beet processing, and to evaluate processing quality of new strains of beets.

BEMISS-JASON BUY — Bemiss-Jason Corp., Redwood City, acquires Display Specialties divisions of Sherman Paper Products Corp., which has main offices at Newton Upper Falls, Mass., and a subsidiary at Los Angeles. Purchase covers display paper inventories and production equipment of both organizations.

TEN-YEAR PROJECT — Westinghouse Electric Corp.'s Sunnyvale plant reveals that it is shipping a series of Navy anti-aircraft guns developed and built under secret Navy Ordnance contract, valued at $33,000,000. Project began at Stanford University ten years ago, and was moved to Sunnyvale at the end of the war. Work on the contract is continuing, with engineering phases completed.

MODERNIZING — Bailey Schmitz Co. has underway a $125,000 plant expansion and improvement program at its Los Angeles furniture and bedding factory, scheduled for completion this month. Work includes added production facilities, new offices, and new shipping dock.

PAINT LAB—General Paint Corp. opens new technical laboratory in San Francisco. Machines and measuring devices are available here for testing wearing qualities, abrasion resistance, flexibility, and qualities of hardness in company's products. Other devices determine light refraction, reflection, and resistance to fading.

PICK CORONA SITE—Gladding, McBean Co., Los Angeles, pick site near Corona for borrow pit and plant for manufacture of tile, brick, sewer pipe, terra cotta, and ceramic products.

WOOLDRIDGE DIVISION — Wooldridge Manufacturing Co. of Sunnyvale is acquired by Continental Copper & Steel Industries, Inc., of New York, and will be operated as a division of that company.

HIGH ALTITUDE RESEARCH—University of California receives $50,000 grant from National Science Foundation for construction of new research facilities on the peak of White Mountain, above Owens Valley, Calif. Research stations are presently maintained by the University at 10,500 ft. (Crooked Creek) and 12,500 ft. (Mt. Barcroft). New station will be at 2,000 ft. above Mt. Barcroft site.

CO-OP TO BUILD—Mt. Shasta Plywood and Hardboard Cooperative will build plant in Gazelle, as well as 600 homes to house member-employees, in summer. Plans call for year-round operation, with 100,000,000 bd. ft. output.

SUB-CONTRACTS FOR NORTHROP—Northrop Aircraft, Inc., of Hawthorne is awarded two sub-contracts, totaling about $2,500,000, by McDonnell Aircraft Corp. of St. Louis, Mo. One is for fuselage assemblies to be used in McDonnell F-101A supersonic fighter plane, and the second calls for engineering design work on a Navy fighter plane.

LOCKHEED BUYS AUTO PLANT — Lockheed Aircraft Corp., Burbank, acquires five-building Willys automobile plant at Maywood from Wilco Properties, Inc., of Oakland. Facility will be used for precision assembly and subassembly operations. During World War II this property was used by Lockheed for subassembly work on fighter planes.

NEW ORDERS FOR ROHR—Total of $26,800,000 in new orders for power packages and other aircraft components is received by Rohr Aircraft Corp., for use in Douglas DC-7C, Lockheed C-130, and Boeing B-52. Company is now employing 5,744 persons at Chula Vista plant and 1,800 at Riverside, and opened an assembly plant at Winder, Ga., early this month.

JET ENGINE CONTRACTS — Ryan Aeronautical Co. is awarded about $4,000,000 of new business covering jet engine components for General Electric, Ford Motor Co., Pratt & Whitney Aircraft, and Wright Aeronautical Division of Curtiss-Wright Corp.

NEW SOLAR VENTURE — Newly formed British company, Sugg Solar Ltd., jointly owned by Solar Aircraft Co. of San Diego and William Sugg & Co. Ltd. of England, is licensed to build and market Solar's Mars gas turbine engine for military and industrial uses. Factory for new firm is now under construction in Crawley, England.

Solar Aircraft receives Air Force contract for development of gas turbine compressor suitable for starting large jet engines such as Allison J71 and Pratt & Whitney J57.

SHIP REPAIR AT L. A.—U. S. Navy contracts totaling over $300,000 go to following Los Angeles Harbor shipyards for repair and overhaul work: Todd Shipyards Corp., San Pedro; Craig Shipbuilding Corp., Terminal Island; and Bethlehem Pacific Corp., Terminal Island.

BUILD BUS TERMINAL—Pacific Greyhound Lines is building $200,000 terminal in Hollywood.

ELECTRONICS MERGER—Berlant Associates and its affiliate, Tri-Di Sound Corp., West Los Angeles, merge with American Electronics, Inc., through exchange of stock, and will be operated as subsidiary of that company. Berlant produces magnetic tape records, and Tri-Di is its marketing organization.

DAIRY FIRM EXPANDS—Dairy Fresh Products Co. moves to leased 73,000-sq. ft. headquarters in Vernon, providing five times production capacity of former plant in Los Angeles. Company plans to install new equipment at cost of $150,000 and hire 30 additional workers, making a total of 100.

NEW MACARONI PLANT—Superior Macaroni Co. of Los Angeles is building $100,000 plant expansion, to be completed in another month, which will double production facilities.

AIRCRAFT TEST BASE—Air Force is building $2,500,000 testing facility at Edwards Air Force Base, for joint use by Douglas Aircraft Co. and Convair Division of General Dynamics Corp.

STUDEBAKER BUY—Aerophysics Development Corp. of Los Angeles is purchased by Studebaker-Packard Corp., to be operated as a wholly-owned subsidiary. Purchased company was founded in 1951 for development work in field of guided missiles and aerophysics.

SEQUOIA EXPANDS—Sequoia Manufacturing Co., San Carlos, will build two new plant units this spring for anticipated 50% increase in production of forced air gas furnaces.

MOVE TO PENINSULA — Guittard Chocolate Co. buys 16-acre site in Burlingame for construction of new candy plant. Present plant in San Francisco will be demolished for freeway construction.

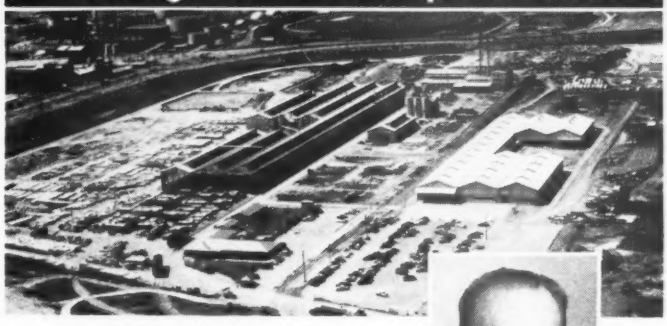
MOVE TO SAN JOSE—Glide-In Manufacturing Corp., Oakland, which succeeds Glide-In Overhead Door Co., will move office and plant to San Jose.

BUY MADSEN—Madsen Iron Works, Inc., La Mirada manufacturer of heavy road construction equipment, is purchased by Baldwin-Lima-Hamilton Corp. and will be operated as a wholly-owned subsidiary.

ANOTHER ELGIN BUY—Elgin National Watch Co., Elgin, Ill., acquires American Microphone Co. of Pasadena, manufacturer of microphones and phonograph components.

URANIUM MILL—Verdi Development Co. will buy Beck Mill at Mt. Soledad for conversion into uranium milling and leaching plant, at total cost of about $100,000.

Looking for a new plant site?



JOHNS-MANVILLE CORPORATION

The Long Beach plant produces Transite® (asbestos-cement) pipe, new types of industrial insulations and Spintex® home insulations for West Coast markets. The plant employs 500 men and women with an annual payroll of $2,680,000.

"From the material side, we picked Long Beach as a plant site after study of proximity to important markets for our products and availability of such things as raw materials, water, rail, and truck transportation facilities, power and building land.

"From the human side, we looked for an adequate number of people with the skills we needed who could be suitably housed. I am happy to say that we work in an atmosphere of mutual understanding which is reflected in high morale and loyalty among employees and efficient production. Established in 1938, the plant has doubled in size since the war."

KENNETH W. HUFFINE
Vice President for Production
JOHNS-MANVILLE CORPORATION

Locate Your Plant in LONG BEACH
IN SOUTHERN CALIFORNIA

BETTER LIVING, with ideal climate and adequate housing are two major reasons people like to live and work here.

Living conditions in Long Beach, "the year-round playground of the Pacific," are pleasanter for employees and employers alike, with our famed 8-mile sandy ocean beach, and the many parks. With the sea at your side and the mountains and desert just a short drive away, it is possible here to enjoy three completely different climates in the same day — as well as a wide variety of recreational attractions, ranging from skiing to deep sea fishing and surf bathing.

Long Beach's modern educational system ranks among the foremost in the nation. It has 139 schools, including City and State colleges, with others in progress.

Representing 39 denominations, there are more than 150 churches located throughout the city.

Other advantages to industry are profit-making climate, rich market area, large labor pool, lowest electric rates, cheap natural gas, abundant water supply, transportation savings, low taxes and economic stability.

Free Brochures: Industrial Long Beach & The Port of Long Beach

CHAMBER OF COMMERCE • DEPARTMENT OF INDUSTRY

200 East Ocean Boulevard, Long Beach 2, California

Coming in June—

2nd Annual Plant & Maintenance Issue of

Western Industry

Articles on maintenance of buildings, grounds, equipment, plant services and plant utilities—concentrating on the special problems of Western plant managers and operating and maintenance executives.

Out June 15

"GO" SIGNAL—At opening of American Can Co.'s new container plant in Denver, Mayor Quigg Newton (far left) pushes starter button, assisted by (left to right): Walter K. Koch, president of Chamber of Commerce; Frank Grote, plant manager, and M. P. Cortilet, Central division vice president of Canco.

COLORADO

TO PICK SITE—Cotarco Co., Inc., a subsidiary of Resources International Corp., New York, plans to build $11,500,000 plant in Colorado for manufacturing oil and char from coal and is reportedly considering six possible sites, among them Trinidad. Firm has operated pilot plant at St. Louis for several years.

ADD TO ROCKY FLATS—Atomic Energy Commission plans $1,500,000 expansion at Rocky Flats plant outside Denver, operated by Dow Chemical Co. of Midland, Mich. Contracts will be let by competitive bid, covering new industrial type buildings. Unconfirmed reports state an overall construction program costing over $18,000,000 is being considered.

NEVADA

BARITE DEPOSIT LEASED — Westvaco Mineral Products Division of Food Machinery and Chemical Corp. leases barite property near Battle Mountain from Glidden Co. of Cleveland, Ohio. Westvaco, which operates barite mines in other parts of Nevada, has a chemical plant at Modesto, Calif., producing barium for industrial use.

SIMPLOT SILICA—J. R. Simplot Co. of Boise, Idaho, buys Nunn Co., Overton silica producer, to be operated by newly organized Simplot Silica Products, Inc., a Nevada firm. Monthly capacity of plant is 10,000 tons of high-grade silica, and Simplot plans further increase in production and development of property.

PROMOTE "ATOMIC EMPIRE"—New Mexico Manufacturers Assoc., looking ahead to industrial use of the atomic engine, will undertake long-range program to develop New Mexico's advantages for electronic and atomic energy industries. Newly elected officers are (left to right): Joseph J. O'Connell, president, Robert E. Filliettaz, managing director; Henry Lewis, second vice-president; and Daniel A. Evatt, treasurer.

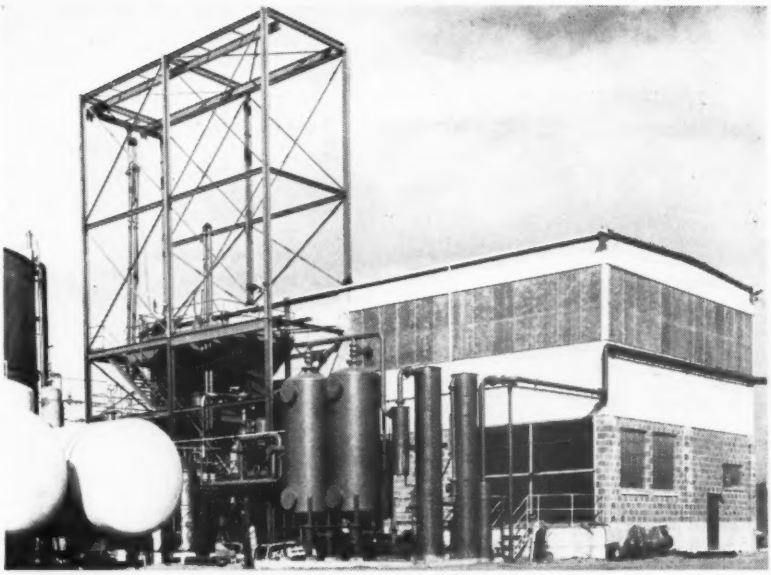
NEW MEXICO

FROZEN FOOD VENTURE—Frio Frozen Foods Inc. acquires 8-acre plant site in Anthony and buys processing equipment valued at $200,000. Building construction will start soon.

NEW PLANT FOR ALBUQUERQUE—Conco Chemical Co. plans to build $150,000 chemical plant in Albuquerque, to employ 20 persons in addition to field men. Main office of company is Dallas, Tex.

NATIONAL POTASH—Freeport Sulphur Co. and Pittsburgh Consolidation Coal Co. form new company, National Potash Co., which will develop potash deposit near Carlsbad and construct plant to have an output of 400,000 tons of potash salts per year, at total cost of estimated $19,000,000. Plans call for production in 1957.

AIRCRAFT REPAIR AT DEMING—Deming Aviation, Inc., a locally-financed Deming venture, installs special test equipment and improves hangar facilities for planned aircraft repair depot. Firm will specialize in modification and overhauling of privately owned planes.



AMMONIA PLANT FOR PORTLAND—Anhydrous ammonia unit now under construction at Portland for Pennsylvania Salt Manufacturing Co. of Wash. is scheduled to begin operations in spring. Plant will use by-product hydrogen from Pennsalt's caustic-chlorine plant in Portland, for production of ammonia by high pressure modified Casale type process.

OREGON

BUY MILL AND LAND — M and M Wood Working Co. of Portland acquires Merryman property near Eureka, Calif., in coastal redwood area, and Rainbow sawmill on Redwood Creek, operated by Dolly Varden Lumber Co. Seller is David D. Bohannon of San Mateo, Calif. Transaction involved several million dollars. Mill will be operated as Plant 2 of Eureka Redwood Lumber Co., a subsidiary.

MYRTLE CREEK CO-OP — Newly formed cooperative, Myrtle Creek Plywood Co., takes options on lease of plywood plant and sawmill formerly operated by Myrtle Creek division of Umpqua Plywood Corp. Another option provides for purchase of timber from Umpqua Plywood. Plant has been closed for several months.

PLAN TWO MILLS—Lock-Joint Toy Co. and Lock-Joint Structures buy plant site in Lebanon for construction of a toy mill this spring and second, larger mill next year, which will produce cottages, garages, grain and storage bins, and farm structures.

MAY ADD KILN—Oregon Portland Cement Co., Baker, undertakes studies on installation of another kiln at its plant at Lime. Kiln would almost double capacity of plant, in anticipation of cement requirements of proposed Snake River hydroelelctric projects.

BUILD AT SAWMILL SITE—Construction begins on 48,000-sq. ft. building for Central Motor Parts, distributor of Chrysler auto parts, at former location of Inman-Poulsen sawmill.

BUY WAREHOUSE—Friedman Bag Co. of Los Angeles acquires former Fred Meyer Co. warehouse in purchase from Oregon State Highway Commission.

UTAH

KENNECOTT RESEARCH GRANT — Brigham Young University, Provo, receives new four-year grant of $50,000 for metallurgical research from Kennecott Copper Corp.

GREEN RIVER PLANT—New uranium ore-buying and sampling plant is planned for Green River, serving Atomic Energy Commission. Facility will be completed in early summer, providing a market for ore mined in this district of central Utah.

WASHINGTON

EXPAND AT PORT GAMBLE—Pope and Talbot plans $2,500,000 expansion of its Port Gamble mill, to cover installation of two-gang sawmill and green veneer plant, and in a second stage, addition of plywood finishing plant. Veneer plant is scheduled to begin operations in early 1956, requiring another hundred employees. Plywood plant will employ additional 150.

NEW KILN—G. W. Emerson Lumber Co. buys kiln equipment of former Tonasket Lumber Co. for installation in new kiln now under construction in Wilbur. Company may add second kiln later.

DISCOVERY BAY—Five Tacoma and Spanaway businessmen purchase Discovery Bay Lumber Co. mill and timber at Port Townsend. New owners plan to electrify mill and add new equipment. Purchasers are Harry Westbrook, Charles Revelle, and Paul Barber, all of Tacoma, and Walter and John Cotton, of Spanaway.

BEKINS TO BUILD—Bekins Moving and Storage Co. plans to build five-story moving and storage terminal in Seattle.

PLYWOOD MERGER—Ft. Vancouver Plywood Cooperative will acquire Vancouver Plywood Co. plant, Vancouver, in purchase agreement involving about $885,000.

SELL PACKING COMPANY—Anacortes Canning Co., Anacortes, is sold to Nakat Packing Corp., subsidiary of Great Atlantic and Pacific Tea Co.

TO BUILD—Chase Machinery and Salvage, Inc., leases five acres in Seattle and will build 4,000-sq. ft. building for offices and repair shop.

KITIMAT EXPANSION—Plans to more than double capacity of aluminum smelter at Kitimat, British Columbia, are approved by Aluminum Ltd., in a program which it is estimated will cost $190,000,000. Present installed capacity of smelter is 91,500 tons; another 60,000 tons capacity is now under construction; and new expansion program will add to this another 180,000 tons. Program, to be accomplished by stages, will be completed in 1959.

WYOMING

TRIAL RUN—Great Western Aggregates, Inc., a subsidiary of Ideal Cement Co., Denver, is conducting tests on production of lightweight aggregate at former government alumina plant, purchased by Ideal last June. New aggregate is produced from shale, and if trial runs, using Colorado shale, are successful, plant will reportedly draw upon vast deposits in Laramie area suitable for process.

ADVERTISERS IN THIS ISSUE

A

Air Reduction Pacific Company 81
Allen-Bradley Company ..... 51 & 52
American Appraisal Company, The 99
American Felt Company ..... Cover 2
American Monorail Co., The 12

B

Bellows Company, The 73
Blackmer Pump Company 80
Blanchard Machine Company, The 26
Butler Manufacturing Company 95

C

C & D Batteries, Inc. 100
Carey, Philip, Mfg. Company, The 65
Carver Pump Company 98
Chicago Bridge & Iron Company 79
Chisholm-Moore Hoist Corp.
Columbus McKinnon Chain Corp. 22
City of Long Beach 109
Cleveland Tramrail Division,
The Cleveland Crane
& Engineering Co. ..... 6 & 7
Colorado Fuel and Iron Corp., The ... Cover 3
Colson Equipment & Supply Company ... 46
Columbia-Geneva Steel Division
United States Steel Corp. ..... 3, 57 & 91
Consolidated Freightways 71
Crane Co. 87

D

Darnell Corporation, Ltd. 102
Denison Engineering Company, The 61
DoAll Company, The 56, 64, 72, 88, 90 & 101
Duff California Company ..... 8 & 9
DuPont, E. I., DeNemours & Co., Inc.
Finishes Division 15

E

Eaton Manufacturing Company
Reliance Division 76
Electro-Chemical Eng. & Mfg. Co. 78
Elwell-Parker Electric Co., The 82
Eutectic Welding Alloys Corp. 89

F

Fabriform Metal Products 20
Fiske Brothers Refining Co.,
Lubriplate Division 93
Flexible Steel Lacing Company 92
Food Machinery & Chemical Corporation
John Bean Division 90
Foster, L. B., Co. 90

G

Garfield Chemical & Manufacturing Corp. 82
Garrett Supply Co.
(Division of Garrett Corp.) 19
General Paint Co. 67
General Petroleum Corporation 5
Grieve-Hendry Co., Inc. 84

H

Harnischfeger Corporation 14
Holz Tire & Rubber Co. 74
Houdaille-Hershey of Indiana, Inc. 77
Hough, Frank G., Co., The 21
Hyster Co. 27

I

Industrial Air Products 99
Industrial Wire Products Corporation 68
Inertol Co., Inc. 83

J

Johnson Gear & Mfg. Co. 97
Johnston, A. P., Co., Inc. 112

K

Kaiser Aluminum & Chemical Corp. 25
Kaiser Steel Corporation 107

L

Ledeen Manufacturing Co. 42
Lubriplate Division, Fiske Brothers
Refining Co. 93

M

Magnesium Company of America
Sub. Christiansen Corp. 66
Maltby, Edward D., Co. 96
Milford Rivet & Machine Co. 98
Moffett Engineering Co. 101
Moto-Truc Company, The 47

N

National Carloading Corporation 68
National Supply Company, The 23
National Welding Equipment Co. 55

O

Oakite Products, Inc. 84

P

Pacific Gas & Electric Co. 104
Pacific Telephone and Telegraph Company . 56
Perin, Ira G., Co. 86
Petley Incorporated 82
Powers Regulator Company 78

R

Randall Graphite Bearings, Inc. 85
Rapids-Standard Co., Inc. 99
Rees Blow Pipe Mfg. Co. 96
Revere Copper & Brass Incorporated 40 & 41
Revolvator Company 102
Roper, Geo. D., Corporation 18
Rust-Oleum Corporation 17
Ryerson, Joseph T., & Son, Inc. 28

S

Santa Fe Railway 24
Short Run Stamping Co. 66
Signode Steel Strapping Co. 54
Skil Corporation 13
Smoot-Holman Co. 69
Standard Horse Nail Corporation 80
Standard Oil Company of California 59
Stanley Works, The
Steel Strapping Division 60
Stephens-Adamson Mfg. Company ... Cover 4
Sterling Manufacturing Company The ... 92

T

Tapecoat Company, The 88
Tuthill Pump Co. 64

U

Union Oil Company 75
United States Rubber Company
Mechanical Goods 43
United States Steel Corporation
Columbia-Geneva Steel Division 3, 57 & 91

V

Victor Equipment Co. 83

W

West Bend Equipment Corp. 93
Western Gear Works 63
Western Industry 110
Western Insulated Wire Co. 72
Westinghouse Electric Corporation
Sturtevant Division ..... 10 & 11

Y

Yuba Manufacturing Co. 97

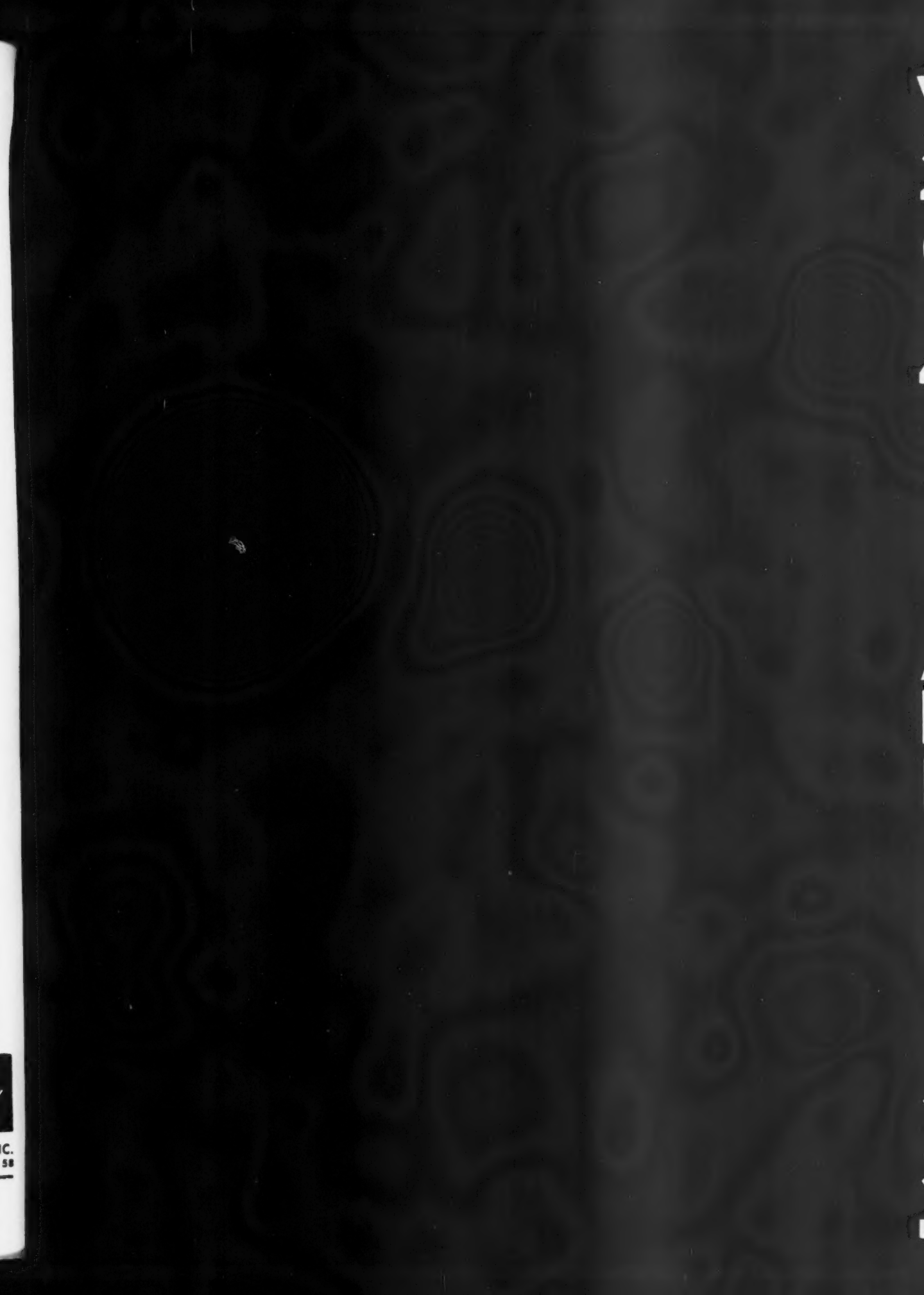
Johnston Stainless Welding Rods

Practical, Down-to-Earth Welding Rods
Alloys as they are supposed to be

Corrosion Resistant—
Clean metal

Strong—
Low in cracking

A. P. JOHNSTON CO., INC.
1845 E. 57th St., Los Angeles 58



you name it...
we weave it
You can get the mesh cloth you want from CF&I. That's because CAL-WIC Mesh Cloth is woven in the most extensive range of mesh and metals available. No matter what the application, you can be certain of obtaining the exact gauge, mesh and metal required when you specify CAL-WIC. Write, today, for full information to the nearest District Sales Office.
2543
CAL-WIC
INDUSTRIAL SCREENS
CF&I

Albuquerque • Amarillo • Billings • Boise • Butte • Casper • Denver • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles • Oakland
Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Wichita
CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Montreal • Vancouver

Zips Bulk Materials Into a "Moving Pipe Line" to Prevent Degradation, Contamination, Dust

S-A "ZIPPER" CONVEYOR-ELEVATORS

for sealed handling of BULK FOOD, CHEMICALS, GRAIN

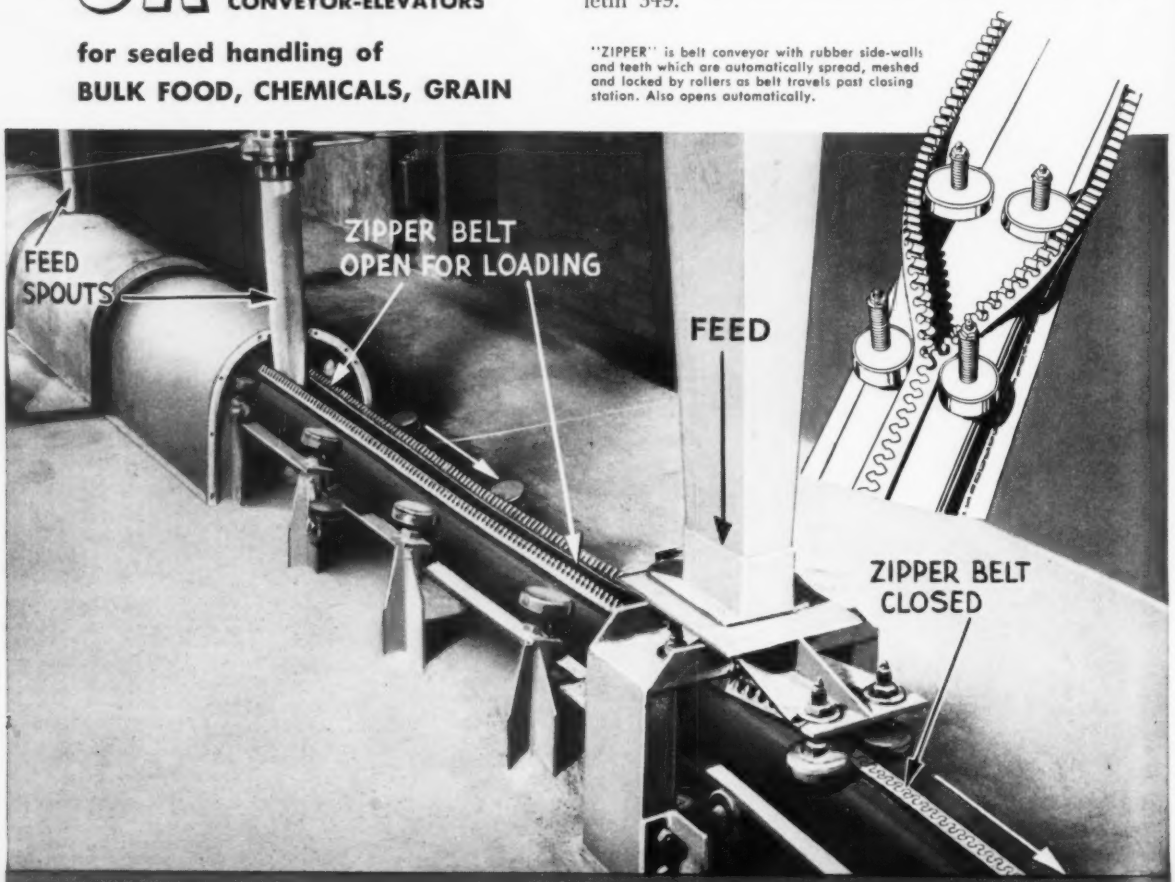
THE S-A "ZIPPER" Conveyor-Elevator seals bulk materials into a rubber "tube" that moves with the load. Conveys up, down or horizontally — in one or more planes — without crushing or packing granular, flaky, pulverized or lumpy materials. There's no agitation, no segregation, no abrasion against conveyor sides, no pressure exerted on the material to move it. The load is fully enclosed — there's no chance for spillage — dust is sealed in, contamination sealed out.

Complete Discharge

"ZIPPER" belt opens for loading and discharge. There are no pockets in which material can collect. "ZIPPERS" are equally suitable for long or short distance conveying and elevating in minimum space and with simple support. Power requirements are usually less than for conventional conveyors handling similar loads.

For more facts and typical arrangements, write for Bulletin 349.

"ZIPPER" is belt conveyor with rubber side-walls and teeth which are automatically spread, meshed and locked by rollers as belt travels past closing station. Also opens automatically.



STEPHENS-ADAMSON MFG. CO.

Factories at Aurora, Illinois • Los Angeles, California • Belleville, Ontario

2227 E. 37th Street, Los Angeles 58, Calif.
151 Mission Street, San Francisco 5, Calif.
1007 E. Burnside St., Portland 14, Ore.
714 Joseph Vance Bldg., Seattle 1, Wash.

JERVIS B. WEBB

CONVEYOR ENGINEERING, MANUFACTURE, INSTALLATION and AUTOMATION

SPEED PRODUCTION FROM RAW MATERIALS TO FINISHED PRODUCT WITH WEBB CONVEYORS

Webb conveyor systems speed production and reduce costs in the handling of bulk materials, parts and finished products. For, regardless of material to be handled, Webb manufactures conveyors that will exactly meet every need and Webb engineers have the installation experience to secure highest efficiency.

Here's how a paper mill utilized Webb conveyors and engineering to obtain best possible materials handling throughout their entire manufacturing operation. In the woodyard, a daily supply of thirteen hundred cords of pine logs from four states is unloaded from railroad cars and trucks onto three Webb chain conveyors. Two conveyors take logs directly to the chippers while third conveyor can carry the logs either to the chippers or storage stacker shown above.

This stacker, which is the largest in use today, is approximately 300 feet long and rises 80 feet in the air. Up to 30,000 cords can be stored by the stacker. Additional chain, belt, drag, screw and apron conveyors automatically perform such functions as: removing chips from storage bins, carrying chips to digester, and conveying bark to storage or boiler house. Even coal from railroad cars is carried on conveyors to the crusher and then automatically distributed to the boilers.

Within the mill a Webb conveyor system handles rolls 6 feet in diameter and 10 feet long. These rolls, which weigh 10,000 pounds, are carried on roller flight conveyors and slat conveyors from cutting and gluing to banding and weighing. Also, through use of a selector mechanism, finished rolls are sent either to storage or to a slat conveyor located on the shipping dock.

4463

Write to us on your company letterhead and we will be happy to place your name on the Webb mailing list to receive factual technical information on conveyor installations, case history reports, and new product literature.

JERVIS B. WEBB CO. of CALIFORNIA

9301 RAYO AVENUE • SOUTH GATE, CALIFORNIA

Specialists in Custom Conveyor Systems

OTHER WESTERN OFFICES:

2166 MARKET STREET SAN FRANCISCO 14, CALIF. • 4305 EMERSON STREET SEATTLE 99, WASHINGTON • 52 W. 2ND S. STREET SALT LAKE CITY, UTAH

Offices and Representatives Throughout The World • **FACTORIES:** *Detroit* • *Los Angeles* • *Hamilton, Canada*